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OVARIAN PREGNANCY AND ENDOMETRIOMA: A PRELIMINARY NOTE.[1]

By BERNARD DAWSON, M.D. (Lond.), F.R.C.S. (Eng.), *Adelaide.*

WHEN I first thought of presenting to this Branch the suggestions contained in this paper, I was bold enough to believe that they were original. Exploration of the literature revealed that the same view had been tentatively presented by Lyle Sutton[(1)] in the *American Journal of Obstetrics and Gynecology,* Volume VII., the value and priority of whose paper I gratefully acknowledge. This paper is intended to be merely a preliminary contribution based, I fear, on slender evidence. The question of ovarian pregnancy has always interested me and whilst in London recently I received from Mr. Eardley Holland[(2)] full details and sections of a veritable case that he reported a few years ago. A thorough study of museum specimens and of the literature convinced me that there was room for considerable doubt as to the accuracy of the commonly accepted views of the ætiology and pathology of the condition.

Belief in the possibility of pregnancy occurring in the ovary can be traced for the past two hundred years. Velpeau and Farre who reveiwed the evidence, found themselves unable to deny the possibility of its occurrence and contented themselves with a verdict of not proven.

The first reliable account of what was apparently a true case of ovarian pregnancy, was reported by M. de S. Maurice in the *Journal de Médecine* of January, 1683.

His patient was an eight para who had not conceived for five years. She suspected pregnancy and had the usual signs. She was suddenly taken ill with symptoms of severe internal hæmorrhage and died within a few hours.

At the autopsy the abdominal cavity was found full of blood clot amongst which was a male fœtus the size of a thumb. The right ovary was the size of a hen's egg and showed a laceration opening into a cavity filled with blood clot. The tubes were normal and the uterus corresponded in size to that of a one month's gestation.

The writer of the article concludes with these words:

Authors speak of certain fœtuses found in the tubes and of others that have been found in the belly, neither the

[1] Read at a meeting of the South Australian Branch of the British Medical Association on June 24, 1926.

tubes nor the womb having been in any way torn; but I do not think that any person has been able to show that conception is made in the testicle or ovarium.

This quotation has the added interest of showing how slowly the word testicle was replaced by the word ovarium which was introduced by de Graaf in 1671 when he described *inter alia* the follicles that bear his name.

Cases have from time to time been recorded by Mendes de Leon, Munro and Teacher, Cuthbert Lockyer, Beckwith Whitehouse, Lendon, Hewetson and Lloyd, Eardley Holland, J. I. Hunter and others. One of the most interesting was that examined by Mademoiselle C. van Tussenbroek,[3] of Amsterdam, in 1899.

This was the first case fully investigated and examined under modern conditions and also the first case of ovarian pregnancy accepted as proven. The patient experienced the usual catastrophe of rupture and internal hæmorrhage from which she was rescued by a successful operation. The specimen removed was not examined for four years when it was found to be one of ovarian pregnancy.

Spiegelberg[4] laid down the criteria that it was necessary to establish to justify a diagnosis of ovarian pregnancy:

(i.) The tube of affected side must be intact.
(ii.) The fœtal sac must occupy the position of the ovary.
(iii.) The sac must be connected with the uterus by the round ligament of the ovary.
(iv.) The ovarian tissue must be found in the wall of the sac.

It is now generally conceded that veritable ovarian pregnancy does occur.

A fertilized ovum in some way obtains a footing upon or within the ovarian stroma and there developes up to the point of rupture. The well known activity of the trophoblastic cells of the zygote undoubtedly plays an important part in this implantation, but the exact means or avenue by which the engrafting of the fecund ovum takes place, is still unsettled.

It is usual to consider that impregnation takes place within the Graafian follicle, the ovum for some unstated reason having remained attached to the *membrana granulosa* instead of escaping into the pelvic cavity.

The Graafian follicle is then supposed to form a gestation sac. This view is difficult to hold in view of some of the recent very thoroughly investigated specimens. These clearly show that the gestation sac and Graafian follicle or rather its subsequent *corpus luteum* are quite definitely separate and distinct. It has been suggested that the fertile ovum may find a lodgement in the minute breach in the ovarian stroma occasioned at the point of rupture of a ripe follicle and there initiate a gestation sac adjoining but separate from the *corpus luteum*. Similarly it has been suggested that the zygote may find foothold in one of the small puckers or fissures that mark the surface of the adult ovary.

In view of recent work I do not think that any one of these hypotheses is sound. In many cases the microscope disproves the view of implantation in a follicle. In cases of ovarian pregnancy the tube is usually intact, healthy and ready to receive the ova upon liberation from the ovary. It is not easy to imagine an ovum fertilized in the pelvis wandering like an Ishmael seeking a fortuitous lodgement upon surfaces which have for it no genetic attraction. There must be another factor to determine the ectopic implantation of the zygote.

Before elaborating this view may I direct your attention to the pathology of implantation adenomata of the pelvic viscera.

Implantation Adenoma or Endometrioma of the Pelvis.

I do not wish to weary you with a recital of the signs and symptoms of these curious neoplasms so aptly named by Blair Bell[5] "endometriomata." The ætiology and pathology of the condition has now been very thoroughly worked out and it is with this aspect of the disease I wish briefly to deal.

Sampson[6] to whom we mainly owe our knowledge, states that they occur most commonly in women from the age of thirty to the menopause. He thinks them of frequent occurrence and has found endometriomata during thirty-seven of one hundred and seventy pelvic operations.

Endometriomata are met with in every part of the pelvic cavity, but mainly in those posterior to the uterus. They may be very small and almost unrecognizable in their early stages. The commonest sites are the ovaries which is what would be expected in view of their causation. As they advance in age they are characterized by their irritative properties that lead to the formation of dense and extensive adhesions between the different viscera and peritoneal folds of the pelvis. The ovarian endometrioma is associated with the formation of the well known blood or chocolate cyst of the ovary. It was at one time thought that the ovaries acted as intermediary hosts for the endometriomata, but this is not so important a feature as some writers have maintained.

Briefly the ætiology of this morbid condition is that during menstruation there is a regurgitation of blood through the Fallopian tubes which, escaping from the fimbriated ends, is sprayed over the pelvic viscera and especially the ovaries. This menstrual blood contains fragments of disintegrating endometrial endothelium which, assisted by the nutritive and adhesive properties of its surrounding blood plasma, grafts itself upon the viscera or peritoneum of the pelvis. The subsequent growth of this uterine epithelium produces two important phenomena:

(i.) The formation of dense adhesions probably due to the irritative properties of minute quantities of secretions from the endometrial cells and to the rupture of the blood cysts.

(ii.) The formation of blood cysts especially in the ovary.

The endometrial tissue on growth is possessed of a power of sending down burrowing processes of

cells to form long, slender glandular invasions of the ovarian stroma. These implanted and invading fragments of endometrial tissue retain their power to respond to the physiological stimulation of the menstrual cycle; in short they bleed during menstruation. If such an endometrioma has so invaded the ovary that it has become included in the stroma, it is easy to see how a blood cyst, increasing in size and tension month by month, can be formed. The ultimate rupture of such a cyst and the discharge of its contents into the pelvis leads to a further implantation of endometrial fragments.

At the British Gynæcological Congress, held in London in April, 1925, I was fortunate enough to see many macroscopical and microscopical specimens of endometriomata. They showed the process very clearly from the earliest invasion of the ovarian stroma to the mature condition in which the endometrial mass was enclosed in dense adhesions. At the same Congress Eden reported the history of a patient upon whom he had operated for some other morbid condition. Noticing a tiny plaque of old blood clot upon the surface of an ovary, he excised it with the neighbouring portion of the ovary. On examination this proved to be a fragment of clot in which were endometrial cells undergoing rapid growth. This specimen, removed from the patient soon after the end of menstruation, showed the earliest stage in the formation of endometrioma; the tiny spot of menstrual blood, regurgitating through the tube, had settled on the ovary there to provide a foothold for the endometrial cells mixed with it. The displaced but still active endometrial epithelium displays all the phenomena of the menstrual cycle and if a sufficient series of cases could be observed, there is no doubt that it would show the præœstral, œstral and resting stages. It has been shown to undergo the retrogressive changes of senility. Further should an intrauterine pregnancy occur, endometriomata share in the active deciduous development of the uterine mucosa. I have mentioned thus fully the comparatively frequent occurrence of ectopic endometrial tissue upon and in the vicinity of the ovaries, because I believe that its presence has an important influence upon ovarian pregnancy. The occurrence of this is *per se* proof that oocyte and spermatozoon may meet in the pelvic cavity.

It has been shown that spermatozoa not uncommonly reach the pelvic cavity. Graafian follicles are frequently maturing and ova being liberated, yet ovarian pregnancy is of extremely rare occurrence. Cuthbert Lockyer found only forty-one proven cases reported between 1899 and 1917. The reason for this rarity is, I believe, that another factor is required: the presence in the vicinity of this intrapelvic conjunction of gametes of some endometrial tissue. In other words transplanted endometrial tissue in or about the ovary provides what may be called a miniature auxiliary womb for the reception of the zygote. Of this attractive view of the ætiology of ovarian pregnancy I have, as yet, no real proof, but only some very suggestive observations to bring to your notice.

In the first place the possibility of fertilization of an ovum within the pelvic cavity is generally accepted.

Secondly consideration of the philogenetic attraction between zygote and endometrial mucosa suggests that the latter is an essential factor in the implantation of the impregnated ovum. Ova not infrequently meet spermatozoa in the neighbourhood of the ovaries. The resulting zygotes are usually received by the tubes and passed along to the uterus where they become imbedded in a receptive endometrial mucosa. The active agency in this imbedding process is the trophoblastic epithelium by which the rapidly developing zygote is soon surrounded. The trophoblast, both cyto-trophoblast and plasmodio-trophoblast has invasive powers, but it has never been shown that the trophoblast of the normally developing zygote is capable of invading tissues foreign to it, whereas its especial affinity for endometrial mucosa is well known.

In the third place the comparative frequency of impregnation taking place in the pelvis and the extreme rarity of ovarian pregnancy suggest the necessity of another factor for its occurrence.

Fourthly in many carefully examined and described specimens of ovarian pregnancy it is clear that implantation did not occur in the Graafian follicle for a maturing *corpus luteum* can be seen separate and distinct from the gestation sac. Lyle Sutton[7] mentions nine authentic cases of ovarian pregnancy in which the gestation sacs are distinct from the *corpora lutea*. On the other hand several observers have reported cases in which they found lutein cells scattered in the wall of the gestation sac, suggesting that the follicle was the site of the original implantation of the zygote. It does not however prove it. It will be readily understood that the rapidly developing gestation sac has a disastrous effect upon the integrity of the ovary which is damaged by the trophoblastic invasion and by hæmorrhage. The swelling sac tends to compress as well as disintegrate neighbouring structures. If now the zygote is implanted in close proximity to a follicle, the subsequent *corpus luteum* may easily become disorganized and compressed by the increasing gestation sac. This point I hope to show more clearly when considering some of the described specimens.

My fifth observation is that the demonstration of endometrial tissue or deciduous cells developed therefrom in the gestation envelope or of Müllerian tissue in other parts of the involved ovary would assist the elucidation of the problem. There is evidence that this exists in some specimens that I will describe.

Sixthly the coexistence with an ovarian pregnancy of endometriomata of other pelvic viscera has been seen in at least one case.

Before considering individual cases, may I point out that the recognition of the true nature of endometriomata is so recent that there has been little opportunity to consider them in relation to ovarian pregnancy.

The occurrence of ovarian endometrioma so disorganizes the ovary that demonstration of tissues is not easy. Ovarian pregnancy nowadays seldom causes death and so thorough examination of the pelvic viscera is not possible.

Review of Cases.

The study of the reports of individual cases brings out several interesting points.

Van Tussenbroek's Case.

Van Tussenbroek's case[3] shows clearly the coexistence of the gestation sac and of a normal *corpus luteum*.

Eardley Holland's Case.

Eardley Holland's case[2] of which I have slides, demonstrated here tonight, also shows undisturbed *corpora lutea*. The gestation sac, situated centrally in the ovary, is clearly shown with its chorionic and part of the amniotic membranes. No fœtus was found.

Microscopically the usual condition is found of an embryonic sac surrounded by blood clot containing many villi. The stroma of the ovary is very little invaded by villi. The specimen underwent some degree of autolysis prior to fixation and the tissues are not as distinct as is desirable. However, in one place immediately underlying the chorionic membrane and separating it from the true stroma of the ovary there is a band of cells of distinct and interesting character. This band is not continuous around the gestation sac and covers but a small segment of its circumference, it lies between the chorionic membrane and the ovarian stroma.

These cells are decidual in type, they occupy a position corresponding to that of the decidua of a normal intrauterine pregnancy. In places this zone is split into two layers leaving a few decidua-like cells attached to the stroma wall of the sac. There are a few of these cells to be seen wandering among the stroma cells, but no deciduous change in the latter. It is probable that this small zone represents a decidua that has developed from a fragment of endometrial tissue which was present prior to the occurrence of the ovarian pregnancy.

Gilmore, Smith and Gatenby's Case.

Gilmore, Smith and Gatenby[7] reported a case which clearly shows the gestation sac as a separate entity from the *corpus luteum*.

Hewetson and Lloyd's Case.

Hewetson and Lloyd's case[8] which was very fully examined, shows a similar arrangement, the *corpus luteum* being separated from the gestation sac by a complete layer of ovarian stroma.

Webster's Case.

Webster's case[9] showed the same distinctive feature. Webster identified certain cells in his specimen that were of undoubted Müllerian origin, and he suggested that there was a connexion between the presence of these and the occurrence of the ovarian pregnancy. It is possible that these cells were derived from an endometrioma of the ovary involved.

Beckwith Whitehouse's Case.

Beckwith Whitehouse[10] reported a case in which the lutein structure was quite distinct from the gestation sac. This specimen is of particular interest because of some associated features. In the patient from whom the ovary was removed, small masses of neoplasm were found in Douglas's pouch on the rectum and on the posterior wall of the uterus which showed very distinct decidual reaction, the deciduous cells being easily recognized. In all probability these were coexistent endometriomata of the pelvis manifesting decidual reaction excited by the pregnancy. This suggests the possibility of similar endometrial deposits existing on the ovary prior to the implantation of the zygote.

Hunter's Case.

In Hunter's case[11] again a *corpus luteum* is distinct from the gestation sac. This specimen shows a very interesting and suggestive development of deciduous cells. The gestation sac contained a shrunken amniotic vesicle without a fœtus; outside this a chorionic membrane with villi bathed in a mass of blood, forming a zone of intervillous spaces; in a portion only of the sac outside the intervillous zone is a layer of deciduous cells outside of which is another zone of blood clot, the whole gestation being enclosed by ovarian stroma. The layer of deciduous cells, called by Hunter the barrier zone, is incomplete and merges in places with the stroma. Hunter maintained that by hæmorrhage a layer of ovarian stroma cells was split off from the wall of the sac and that this partially isolated zone underwent decidual change to form the barrier zone. It is interesting to note that there are no villi to be seen outside this layer. At one end the barrier zone merges with the ovarian stroma cells among which scattered deciduous cells can be detected. Hunter regarded this as a decidual reaction of the ovarian stroma cells, but it is more probably a decidual reaction of a fraction of endometrium grafted on the ovary which offered a suitable and sympathetic bed to receive the zygote. If it were a decidual reaction of the stroma cells, it is difficult to understand why it should be limited to a small segment of the gestation sac and why the reacting cells are not completely surrounded as are those of the ovarian stroma.

Lendon's Case.

A. A. Lendon[12] reported a case in the *Australasian Medical Gazette* which was examined by Dr. de Crespigny who stated:

> Furthermore a recent *corpus luteum* was present in the ovary and instead of being in the form of a ring, the yellow layer of the *corpus luteum* is a curved line partially enclosing the pregnancy and separating it from the rest of the ovary. The appearance is as though the *corpus luteum* were ruptured by growth of its contents.

Such an appearance, however, could be occasioned by pressure upon the *corpus luteum* by the rapidly growing gestation sac.

Lyle Sutton's Case.

Lyle Sutton[1] reports a case in which he found lutein cells in the wall of the ovarian hæmatoma. He also made the interesting observaton that there was Müllerian tissue in several parts of the lining of the hæmatoma and suggested a possible association between ovarian pregnancy and ovarian endometrioma.

Kelly and McIlroy's Case.

Kelly and McIlroy[13] in their case found lutein cells in the wall of the gestation sac.

Cuthbert Lockyer's Case.

Cuthbert Lockyer[14] reported two cases showing lutein cells in the wall of the blood cyst, but he added that immediately outside the gestation sac was a necrotic zone containing the remains of a *corpus luteum*, thus suggesting that the *corpus luteum* had been disintegrated by the vigour of its neighbour. If impregnation of an ovum within the Graafian follicle is not the true explanation of ovarian pregnancy, some reason must be found for the presence of lutein cells in the wall of the blood cyst.

The diagrams of van Tussenbroek's and Hunter's cases suggest that the absence or presence of lutein cells in the wall of the hæmatoma depends upon the juxtaposition of the gestation sac to the *corpus luteum* and also upon the size to which the former grows before rupture. If these two bodies are closely apposed and the gestation sac grows to a sufficient size, the *corpus luteum* becomes disorganized and flattened out over the sac so that lutein cells become incorporated in its wall.

The beginning of the process is seen in van Tussenbroek's case and more plainly in Hunter's. In the latter it will be seen that the *corpus luteum* is already becoming distorted and flattened, the lutein convolutions adjoining the gestation sac are atrophic and incomplete. Although there is a definite zone of stroma cells between the two bodies, it is not difficult to see that had the gestation sac grown larger, the *corpus luteum* would have been spread out upon its surface.

Discussion.

The basic hypothesis of this paper is that endometrial epithelium capable of undergoing preparation and decidual development is necessary for the implantation of a fertilized ovum. This is a revival and expansion of Webster's view[15] that Müllerian tissue can alone generate a decidua. It is interesting to note that in 1904 Webster reported a case of ovarian pregnancy characterized by deciduous cell formation at the site of the implantation of the ovum. This view of Webster was presumed to have been exploded by the discovery of deciduous cells in other locations remote from Müllerian structures.

It must be remembered that the identification of these ectopic decidual masses was made prior to the work of Sampson on endometriomata.

Taussig[16] states:

> In a considerable percentage of pregnancies, no matter what the site may be, a formation of decidua-like cells is found outside the point of implantation of the ovum, even at a considerable distance from it.

This ectopic decidua has been described in a variety of situations, but mainly in the pelvis. It has been found fairly frequently on the ovaries, the posterior surface of the uterus, in the pouch of Douglas and on the anterior surface of the rectum, more rarely on the omentum or between adherent coils of intestine.

Now it is very significant to note that the sites of these deciduous cells correspond exactly to the sites of endometriomata of the pelvis. Endometriomata are known to undergo a decidual change when pregnancy, uterine or ectopic, occurs. They are relatively common, Sampson finding them in thirty-seven of one hundred and seventy pelvic explorations.

It is so probable as to be almost certain that these ectopic decidual masses are really endometriomata responding physiologically to the stimulus of pregnancy.

Webster's view that deciduous tissue can be the product only of Müllerian structures is not confuted, but rather confirmed by the discovery of ectopic deciduous formation, when this is studied in conjunction with endometriomata.

The idea embodied in this paper is an extension of that of Webster, that is that an impregnated ovum can implant itself only on Müllerian tissue capable of decidous change and not haphazard upon any tissue in the vicinity for which it has no philogenetic attraction.

The same theory may conceivably be extended to tubal pregnancy. This is outside the scope of tonight's paper, but I should like to mention that decidua-like cells have been found in the mucosa of the Fallopian tubes in cases of normal intrauterine pregnancy and that Roy and Donaldson in the *Proceedings of the Royal Society of Medicine* of January, 1926, gave an account of endometriomata of the tubes.

Summary.

1. Investigation of the subject is difficult because material is scanty, often damaged by operative procedures and disorganized by the invasive nature of zygotic implantation.
2. Ovarian pregnancy probably does not occur in a Graafian follicle.
3. It does not occur fortuitously in fissures and scars of the surface of the ovary.
4. It does occur when endometrial tissue is present in the form of an endometrioma which, participating in the deciduous changes consequent upon impregnation, offers a suitable and philogenetic bed for implantation.

References.

(1) Lyle A. Sutton: "Ovarian Pregnancy with a Report of a Case," *American Journal of Obstetrics and Gynecology*, 1924, Volume VII., page 1.

(8) Eardley Holland: *Proceedings of the Royal Society of Medicine*, 1911.
(9) C. van Tussenbroek: *Annales de Gynécologie et d'Obstétrique*, Volume LII., page 537.
(10) Spiegelberg: *Archiv für Gynäkologie, Band* VIII., *Blatt* 73.
(11) W. Blair Bell: "Endometrioma and Endometriomyoma of the Ovary," *Journal of Obstetrics and Gynæcology of the British Empire*, 1922, Volume XXIX., page 443.
(12) J. A. Sampson: "The Life History of Ovarian Hæmatomas (Hæmorrhage Cysts) on Endometrial Müllerian) Type," *American Journal of Obstetrics and Gynecology*, 1922, Volume IV., page 451.
(13) Gilmore, Smith and Gatenby: *Journal of Obsterics and Gynæcology of the British Empire*, Volume XXIII., page 339.
(14) John T. Hewetson and Jordan Lloyd: "Ovarian Pregnancy (With Notes of a Case)," *The British Medical Journal*, September 8, 1906, page 568.
(15) Webster: *American Journal of Obstetrics and Gynecology*, 1904.
(16) Beckwith Whitehouse: "Remarks on a Case of Probable Ovarian Pregnancy," *The British Medical Journal*, May 28, 1910, page 1276.
(17) John I. Hunter: "Embryological Specimens of Clinical Interest (A Case of Early Primary Ovarian Pregnancy)," THE MEDICAL JOURNAL OF AUSTRALIA, September 24, 1921, page 233.
(18) Alfred Austin Lendon: "A Case of Ovarian Pregnancy," *Australasian Medical Gazette*, May 11, 1912, page 492.
(19) Kelly and McIlroy: *Journal of Obstetrics and Gynæcology of the British Empire*, Volume IX., page 389.
(20) Cuthbert Lockyer: "Two Cases of Primary Ovarian Pregnancy (With a Review of the Literature, 1910-17)," *Proceedings of the Royal Society of Medicine*, June, 1917, page 158.
(21) Webster: "Human Placentation," Chicago, 1901.
(22) F. J. Taussig: *Surgery, Gynecology and Obstetrics*, March, 1906, page 292.

TUBERCULOSIS OF THE SPINE: EARLY DIAGNOSIS AND TREATMENT.

By HUGH C. TRUMBLE, M.C., M.B., B.S. (Melb.) F.R.C.S. (Eng.),
Honorary Surgeon, Austin Hospital for Incurables, and Chronic Disease; Honorary Surgeon to Out-Patients, Alfred Hospital, Melbourne.

TUBERCULOSIS of the vertebral column is a disease which in Victoria is by no means uncommon. There are always in the wards of the Austin Hospital some forty or fifty patients suffering from the disease and always several more waiting admission. It has been my lot to direct the treatment of most of these patients for some years past and certain facts have forced themselves upon my notice.

I do not propose to discuss the subject exhaustively, but rather to stress some points which seem to me worthy of emphasis and in particular to attempt to outline a course of action which may be of assistance to the general practitioner when confronted with a case which may or may not be one of Pott's disease.

My patients have been in the majority of cases of adult age. Usually before I saw a patient the diagnosis had already been correctly made. Only rarely was anyone admitted to the Austin Hospital in the early stages of the disease and frequently deformity or abscess had appeared. It soon became evident that the patients arrived at this late stage not because they had been treated elsewhere for the malady in question, but because the diagnosis had been at fault and the serious nature of the complaint not recognized until a gibbus or abscess obtruded itself.

I proceeded to question carefully many of the patients. In some cases the history was too indefinite to be of use, usually because the patient was too old or too young to remember the early symptoms. A consideration of the stories told by twenty-eight persons so selected revealed the facts and figures following.

The average length of the period of time intervening between the date of onset of symptoms and that of the establishment of the correct diagnosis was twenty-five months, the shortest being one month and the longest six years. This interval usually coincided with that elapsing before the patient became completely disabled. In this connexion it is worth noting that a subject may carry on heavy manual labour for months even years, before finally being compelled to give in. More especially is this so when the lesion is situated low down in the spine.

The patients who had consulted medical men on account of their earlier symptoms, had been supplied with diagnoses of varied assortment, in order of frequency as follows: Rheumatism, renal disease, lumbago, neuritis, myositis, neurasthenia and rupture. The last diagnosis was in reference to a psoas abscess which was opened during the operation for the cure of the supposed hernia.

From a consideration of the above it is obvious that in many, if not in most cases, faulty diagnosis leads on to faulty treatment which treatment extends over a variable, usually lengthy period of time during which the condition of the patient becomes progressively worse. When at length the correct diagnosis is made, the state of affairs is this: the patient has now a lesion more advanced than he had when reporting for treatment and he has wasted (so far as the cure of his complaint is concerned) the intervening period. In addition, restoration of health is likely to be more difficult of attainment and to consume more time than need have been expended, had an earlier diagnosis been made.

DIAGNOSIS.

How can this sad state of affairs be remedied? How, in other words, can an earlier diagnosis be made? It must be admitted at once that there are patients presenting remarkably few symptoms. Recently I saw a man in whom a psoas abscess had been opened and in whom a skiagram disclosed definite involvement of a lumbar vertebra. No amount of questioning could elicit one single symptom that might have suggested any such lesion. Other similar instances could be quoted. Usually, however, symptoms of a more or less suggestive nature are present. Looking back over the histories that I have accumulated, I can see (from the vantage point of the arm-chair critic) that in almost every case there was evidence enough to have suggested the correct diagnosis long before it was finally made, evident enough to have demanded at

least the most thorough possible investigation, evidence that should have stamped the patient as seriously ill until proved otherwise.

Early Symptoms.

Pain.

Foremost among the early symptoms is pain. In practically all of my patients this was present at some stage of the disease and was the first symptom in twenty-three. Three types of pain may be described. The first of these is a dull aching in the back, somewhere in the region of the lesion. This, the most common variety, occurred in twenty-four of the cases in this series, being the first symptom in nineteen. Second in order of frequency of occurrence are radiating or so-called root pains. Patients describe these pains variously as "stabbing," "gripping," "a feeling of tightness round the chest or abdomen" and so on. This type of pain occurred in twenty-one cases. The third type consists of starting pains or sudden violent pains waking the patient from sleep when the muscles are off guard; they are not often encountered. Only two patients in this series had experienced pain of this type.

Recently many writers have discussed the ætiology of pain in the back and few indeed are the organs which have escaped blame. It appears to me that not enough attention is paid as a rule to the nature of the pain, to its variations and the influence of different controllable factors upon it. If by placing a strain on a certain structure the discomfort is increased, whilst on the other hand it is decreased when this tissue rests, it is fair to assume that the structure in question is the seat of the trouble. Suppose that the patient complains of an aching pain in the small of the back which is worse when he is constipated and relieved by an enema, but not affected by changes in posture, then it is probable that the discomfort in question is in the nature of referred pain from the bowel. If the pain is increased by exertion in the upright position and decreased by rest in the recumbent, then it is possible that its origin is in some structure whose function it is to resist the action of gravity in the former position. The spine is such a structure. Its mechanism will be discussed in dealing with treatment.

In Pott's disease one would expect that pain would be diminished by rest and increased by exertion in the upright position and in practice this is so with certain reservations. In the early stages of the trouble there frequently occur periods of freedom from discomfort during which the subject may perform hard manual labour. Gradually, however, these intervals become fewer and shorter and the pain more constant. In some cases, on the other hand, rest of short duration does not relieve the symptoms. Indeed it is characteristic of inflammatory lesions of the spine, including tuberculosis, that the aching painful stiffness, so often complained of, is felt at its worst when the patient attempts to move from a position which he has maintained for some time. Thus when the subject rises from the sitting posture, severe discomfort may ensue, so that he is quite unable to straighten himself for some minutes. After moving about for a while the symptoms abate. It may be that whilst in a maintained position certain structures in the region of the focus become distended with inflammatory fluids and so are in no condition to function normally until these fluids are slowly squeezed out by the painful movements mentioned above. Frequently in Pott's disease the subject states that he has difficulty in getting out of bed on account of the pain and stiffness in his back, but that as the day goes on his condition tends to improve. This sequence of events is of course not confined to tuberculous infections, but may be observed in any chronic inflammatory process. When the diseased spine is placed at real rest, there is as a rule a rapid disappearance of pain, at least in Pott's disease. Should this improvement fail to follow shortly after efficient immobilization of the spine in the recumbent position, the possibility of other conditions such as new growth should be considered. Radiating pains usually disappear soon after the institution of efficient rest.

In coughing and sneezing there is a sudden spasmodic contraction of the abdominal musculature and other muscles whose combined effect is suddenly and powerfully to flex and compress the spine as a whole. Almost always the pain in the back is increased or unmasked by these actions. Often after the patient has been properly splinted and pain has ceased to be, sneezing will remind him that all is not yet well.

The so-called root pains are somewhat difficult of explanation. I do not think that they are caused by pressure on the issuing nerves, but regard them rather as referred pains. It is common knowledge that in hip joint disease pain is frequently referred to the front of the thigh or knee region and that in sacro-iliac disease "sciatica" is usual. Probably the different joints in the spine are linked in the same way with certain skin areas and "root pains" resemble "sciatica."

Stiffness.

Stiffness or rigidity is the second most commonly occurring early symptom. It is intimately connected with the local pain already described and is often not well distinguished by the patient. Difficulty is sometimes experienced in bending to lace the shoes and stooping is avoided. Free movement is opposed involuntarily by the muscles on guard and by conscious action on the part of the patient when pain is felt. Limitation of movement will almost always be evident on examination, at least when the lesion is situated in the more mobile portions of the column. In the dorsal region in adults particularly movement is normally so limited that it is difficult to be sure whether or no there is abnormal restriction of mobility. The stiffness which occurs on rising from bed or from the sitting posture, has been discussed in the paragraph on pain. The characteristic actions of the patients, when asked to pick

up an object from the floor, are too well known to require description.

Weakness.

Weakness is not so commonly noted as might be expected. Frequently adult patients carry on strenuous work for long periods. In the lumbar portion of the spine the body of a vertebra is massive and a small focus, superficially situated, may exist for a lengthy period without seriously impairing its weight bearing capacity. Later when more extensive damage is present, the patient has a feeling that he may not exert himself as of yore. One day the collapse occurs, but that is late in the disease and has nothing to do with early diagnosis.

General Symptoms.

General symptoms are usually present in the form of slight pyrexia, moderate loss of weight, malaise and possibly night sweats. As a rule these are not striking phenomena and they may be practically absent. As the disease progresses, the general health tends to deteriorate more and more.

At this period it is of use to review the position. Let us suppose that a patient presents himself complaining of an aching stiffness in the back, made worse by exercise, jolting, coughing or sneezing, but relieved by rest, only to reappear when work is resumed; that in addition he is off colour generally and has not been well for some time and finally that an examination discloses nothing abnormal in any of the thoracic or abdominal organs, but does reveal a limitation of spinal mobility. Consulted by such a patient, the medical adviser is not justified in making a diagnosis of rheumatism or lumbago and dismissing him with a liniment. A tentative diagnosis of inflammation of the spine must be made and the investigation carried further. A searching inquiry should be made into the past history of the patient, his family history and finally special examinations, notably the blood reaction to the Wassermann test and a skiagram, should be undertaken.

The Family History.

Many writers state that in nearly all cases of Pott's disease a family predisposition to tuberculosis exists. Such an hereditary influence was found to be present in but few of my patients. A normal history is therefore not of great importance in excluding tuberculosis. The discovery of a rheumatoid diathesis in the family would suggest that the disease under investigation might be of a similar nature.

The Past History.

Previous Tuberculous Disease.

Tuberculosis of bone occurring as a primary infection is exceedingly rare. Almost always the primary focus can be found in a gland or lung, at least at the *post mortem* examination. A history of previous tuberculosis in the body would be in our suppositious case highly suggestive. But frequently there is no such history because a small focus in a lung or a mediastinal gland may pass unnoticed. Here again whilst a history of disease is of importance, a normal history is not so. In this series of twenty-eight patients twelve had had previous definite or probable tuberculosis.

Injury.

Many patients date their troubles from some particular fall or blow on the back. Often enough there is no apparent connexion between injury and disease. It is probable that in some cases the trauma lowers the resistance at some point and allows circulating organisms to find a congenial home. More often a slight injury serves to unmask a disease already present for some time, but previously causing no symptoms. Just as women afflicted with carcinoma of the breast can always recall some local injury, so a patient with spinal trouble feels it incumbent upon him to remember some injury to the back. Unless the trauma in question is of moderate severity and occurs within a reasonable period before the onset of symptoms, it may be disregarded as an aid to diagnosis.

Other Disease.

A history of disease other than tuberculosis is of importance. Chronic joint lesions elsewhere in the body of a rheumatoid nature would suggest the same trouble in the spine. Here it is of interest to note that a large proportion of patients suffering from so-called rheumatoid arthritis of the spine have had gonorrhœa and often manifest traces of chronic infection of the vesicles, prostate *et cetera*. The teeth, throat and other organs should be examined as possible sources of infection. Syphilis of the spine may closely resemble Pott's disease. A history of infection or a response to the Wassermann test, together with the rapid disappearance of symptoms under treatment, would indicate the nature of the causative organism. New growths of the vertebræ should be considered and the breast, prostate, abdomen and so forth should be examined for primary carcinoma. Fears that the lesion may be malignant in nature will arise if, in spite of efficient treatment, the symptoms progress and the patient goes down hill.

If then a provisional diagnosis of inflammation of the spine has been made, a careful investigation of the history on the lines suggested may point the way to the correct diagnosis of the cause. Lastly, the radiologist is called in.

Radiology of the spine is extremely difficult and requires a highly efficient skiagraphist equipped with the best apparatus to insure reliable results. Antero-posterior and lateral views should always be taken and often oblique views as well. Usually in a case of Pott's disease the focus can be definitely demonstrated, but not infrequently nothing abnormal is detected. The patient is then reassured and dispatched with the usual diagnosis of rheumatism and a liniment. His condition steadily becomes worse and when after some months he is once more examined by X rays, there is the focus! A normal skiagram in the early stages is not conclusive evidence that there is no tuberculous involvement of a vertebra.

We are now at the end of our resources. Usually after summing up the evidence obtained by the above outlined investigations, we shall be able to say with some certainty exactly what is the underlying pathology. But consider the occasional case in which neither the history nor the skiagram has given us any decisive aid. Here is a difficult problem. It is easy to dispatch the patient to swell the ranks of that unhappy band whose members rejoice (or despair) in such diagnoses as rheumatism, neuritis, myositis and so forth; but having made our diagnosis of inflammation of the spine, we must not be shaken in our faith by a normal skiagram. Whatever may be the causative organism, the condition is a serious one and calls for efficient treatment. It may be tuberculosis, in which case the sooner treatment on the lines outlined below is instituted, the better for everyone concerned. It may be rheumatoid arthritis and here again in the acute stage the same treatment could do no harm. On the other hand if allowed to go untreated until frank tuberculosis declares itself, the patient will have so much further to retrace his steps on the way to cure and the cure, when at length attained, may not be so complete. The safer course to pursue is to regard and treat the condition as tuberculosis, at the same time eradicating all suspicious foci in the body generally, paying particular attention to the teeth, naso-pharynx and genito-urinary apparatus. At the end of two or three months, a further skiagram should be taken. A tuberculous focus may now be revealed, in which case the course is clear. If the picture is still normal and if symptoms and signs have disappeared, the patient may be allowed up and assured with some degree of certainty that he is not afflicted with tuberculosis. If signs and symptoms be still present or if they reappear after resumption of exercise, further treatment on the lines indicated below must be instituted until a definite diagnosis can be made. In those patients who ultimately prove to be free from tuberculosis, the pursuance of the above outlined scheme would appear to have resulted in a waste of time. But such ambiguous cases are not common and the sum total of time so lost will be as nothing compared with that lost at present on account of late diagnosis.

TREATMENT.

The diagnosis of Pott's disease made, the broad principles of treatment are clear. The general health of the patient must be brought to as high a pitch of excellence as possible, whilst the affected part, the spine, must be placed at physiological rest. The remaining all important agent is time. Details in the management vary with the surgeon and circumstances, but the above principles must not be neglected.

General Treatment.

The general treatment is the same as that of tuberculosis elsewhere in the body and need be only briefly outlined, Rest in bed and an ample nutritious diet, including fresh foods of varied assortment, are essential. Vaccine therapy is of more doubtful value and personally I have not seen any very striking results follow on its institution. Eradication of infective foci and regulation of the bowels should receive careful attention. Last, but not least, is heliotherapy and of this a little more may be said.

Heliotherapy.

The work of Rollier, Gauvain and others is so well known that it is unnecessary to enter into much detail regarding this important branch of treatment, heliotherapy. So amazing are the results in some cases, that it is hard to resist the conclusion that man has succeeded by the exercise of extraordinary skill in designing dwellings and clothing of a most unsuitable type in semi-asphyxiating himself. Not only does he largely put out of action the naturally magnificent heat regulating function of the skin, but he substitutes for the light, fresh, cool, radiant atmosphere which should bathe and stimulate this organ, one which is dark, stagnant, hot and moisture laden. Little wonder that in many cases the organism droops and wilts; little wonder that so handicapped it becomes an easy prey for the lurking enemy. Once this enemy has gained a foothold, it is time to adopt a mode of living more in keeping with the requirements of man in his native state. *"Retournons à la nature"* might well become once more a popular slogan. One has but to observe the changes which take place when these tuberculous subjects are placed in the open air and the light of day, to realize how handicapped they were previously. The thin, pale, weary and flat chested sufferer, in an incredibly short space of time becomes plump, tanned, full of life and spirits and his chest appears to increase in volume from day to day, probably because of the increased respiratory excursus necessitated by the higher rate of metabolism, which in its turn is called forth by the stimulus to the skin of light and cold. The muscles generally waste much less than is usual in bedridden patients, probably because their heat producing function is exercised to the full.

In practice the patient is kept outside night and day, preferably resting on a wheelbed. He is encouraged to decrease progressively the amount of bed coverings, until he needs next to nothing except during excessively cold snaps. During the day he wears a pair of "shorts" and is otherwise fully exposed. Commonsense is necessary to regulate the details of this exposure. It is not advisable to permit the hot midday sun to shine on his skin. In hot weather the play of sunwashed cool air is of more benefit than are the direct rays of a summer sun. The patient should never feel uncomfortably hot.

Local Treatment.

Before proceeding to a consideration of ways and means of placing the affected portion of the spine at rest, it is necessary to have in mind a clear picture of the functions of the column and the forces with which it has to contend. In the quadruped the lumbar and dorsal segments of the vertebral column together form a flat, semi-rigid arch, poised at either

end on the fore and hind limbs. The force of gravity acts in a direction at right angles to the base line of the arch. The extremities of the structure, architecturally speaking the springers, are not fixed the one in relation to the other, but are free to move apart, allowing the curve of the spine to flatten and to approach or even sag below the horizontal plane. Obviously no keystone effect is possible. In a stone archway rising from the ground the force of gravity causes a crowding together of the component blocks, so that none fall. But suppose the springing stones to rest on a couple of mobile trucks. Here the same force will cause the trucks to move apart and consequently the arch to collapse. The segment of the spine under consideration resembles somewhat this latter system. The arch would collapse except for the action of the flexor muscles and ligaments which act as chords to different segments of the curve. The important point to note here is that in the dorso-lumbar spine of the quadruped or of man when lying prone in the horizontal plane there is little or no compression of the vertebral centra due to the action of gravity. In the cervical region the position is quite different. Here the heavy head is supported in mid-air at the end of the cervical spine, which in turn is fixed at one end only. The whole structure resembles a cantilever verandah, the tie rod being the *ligamentum nuchæ* and other ligaments connecting the spinous processes to each other and to the skull. It is obvious that the force pulling along the line of the ligament, combined with the force of gravity, will result in a crowding of the cervical vertebræ, the bodies of which must be capable of withstanding this compression in order that the form of the column may be maintained. The effect of this compression is well seen in the spine of such an animal as the elephant whose cervical centra are practically as massive as the lumbar. In birds the whole spine is supported at its sacral end only. The cervical spine is more or less vertical, whilst the dorsal and lumbar regions are placed in an approximately horizontal plane.

In man the entire column, supported at one end only, approaches the vertical. Here the force of gravity acts in conjunction with the pull of muscles and ligaments surrounding the bony spine, to compress powerfully the bodies of the individual vertebræ. This compressing force is naturally greater low down than high up in the spine and so the lumbar bodies are designed on more massive lines than the dorsal or cervical. Every effort of inspiration, every exertion of the trunk muscles in lifting, coughing, sneezing *et cetera* augments the force and calls for more resistance on the part of the vertebral centra.

Man has by no means lightened the burden of the spine by assuming the erect attitude. Indeed the load is such that only a strong, healthy spine may carry it. The very young spine, the very old spine, the rickety spine *et cetera* collapse under it. The spine affected by tuberculosis may be expected to do the same.

In order to lighten the load the action of gravity must be counteracted as far as possible. A little consideration will show that no splint is capable of doing this, supposing the erect attitude to be maintained. The patient must therefore lie down. He may be prone or on his back. In the former position the force of gravity tends to produce a ventral bowing of the column and so to prevent the formation of a gibbus or to reduce one already present. It would seem to be the most suitable position and in the case of children is quite effective and practicable. In adults for various reasons it is not so suitable and usually the dorsal decubitus must be adopted. In this position the force of gravity acts to produce a kyphosis and in time will do so even in a normal spine. Collapse or increase of a gibbus may occur whilst the patient lies in bed. In order that this may not happen the column must be supported. Many splints are used for this purpose, but one in my opinion is preeminent—the spondylitis or plaster bed of Lorenz. It is easily constructed. It fits the back perfectly and so exerts an even pressure over the whole dorsal surface with the result that it is absolutely comfortable and never causes pressure sores. The ventral body surface is left uncovered, so that heliotherapy is not interfered with. The patient may be rolled over and the splint lifted off so that the skin of the back may be inspected and tended. No other form of support of which I have any experience, meets all these requirements.

The Plaster Bed.

The materials needed for the construction of a plaster bed are: (i.) Plaster of Paris, which should be of good quality. About 6·7 kilograms (fifteen pounds) should be obtained. A small amount is mixed with water and allowed to harden in order to ascertain the rate of setting. Good plaster mixed with three-quarters of its volume of plain cold water sets in less than ten minutes.

(ii.) Eight ounce scrim or hessian, which can be obtained at any large decorators. This is cut into strips a little longer than the distance from the patient's sacrum to the base of the neck or skull as may be necessary (see later). The width of the strips is equal to the distance between the shoulder tips.

(iii.) Stockingette or mutton cloth about one metre.

(iv.) Several dishes for mixing plaster, gowns, water, knives for trimming edges *et cetera*.

The patient being stripped, the tubular stockingette is slipped over his head and shoulders. About fifteen centimetres (six inches) from the head end small openings are cut in the stockingette opposite the points of the shoulders. Through these openings the arms are passed. The slack round the neck is taken up and stitched over each shoulder and the lower end of the fabric is pulled down until all folds disappear and the material lies closely applied to the body. It is fixed by a safety pin uniting the anterior and posterior folds in the crutch. Stockingette is used because of its small cost and ease of application. A closely fitting singlet serves as well. The body covered as described, the patient is now placed prone on a long narrow table or trolley, supported on pillows or sandbags, one under the forehead, one under the upper part of the chest and

throat and one under the pelvis. The lower part of the chest and abdomen are left free. This method of support (in the quadruped position) favours a hyperextension of the dorso-lumbar portion of the spine and also raises the trunk from the table, thus facilitating the application of the plaster. The arms should be slightly abducted from the sides, but not more than about 30° in order that the scapulæ may not be rotated. Care must be taken to avoid any asymmetry in the position of the patient. The plaster is then mixed. It is best as a rule to mix about three kilograms in a large basin with three-quarters of its volume of water, cold or lukewarm. Salt should not be added. An assistant then rapidly dips the strips of scrim in the plaster, unfolds them and hands them so to the chief who places them on the back of the trunk and neck in successive layers, split end uppermost. The strips are long enough to be folded over at the bottom, so increasing the strength at this point. After placing a layer in position, plaster is freely poured on and smeared over (not rubbed off) with the hands. Extra small strips of scrim and more plaster should be introduced across the back of the scapula region, as this is the weakest point in the structure. Strong curved flanges pass ventrally over each shoulder. By mixing only portion of the plaster it is possible to proceed quietly and methodically, as there is no likelihood of setting occurring before it is used. More is then mixed and the process continued until the slab is about two and half centimetres (one inch) in thickness. In a few minutes it will be set hard enough to be removed (after the stockingette has been split along the mid-line anteriorly). The edges are then trimmed with a knife and the plaster is left to dry. It is not replaced until thoroughly dry. The edges of the plaster, after trimming with a knife, should be bound either by applying a strip of gauze and affixing the same with the plaster or by the use of adhesive plaster. The whole slab when dry should be painted over with shellac dissolved in methylated spirit, three coats being applied. The plaster treated in this way, becomes impervious to water and may be washed.

Many patients have told me that they are more comfortable when lying in a plaster slab bed than in any other or no apparatus. Certain details, however, need attention. In thin patients there are prominent, thinly covered bony points on which the plaster may press and if neglected cause irritation of the skin and pressure sores. To avoid this trouble is a simple matter. Either the plaster over the area in question may be scooped out to a depth of about six millimetres (one-fourth of an inch) or else before the construction of the slab is commenced, small discs of cotton wool may be fixed over the projecting area. On removal of the plaster these fragments of wadding come away, leaving a depression in the splint surface corresponding to the eminence on the body surface. The points most frequently needing such attention are the posterior superior iliac spines and the summit of the gibbus if present. In order to keep the inside of the plaster clean, it is wise to insert a layer of thin material between it and the patient, material so thin that wrinkles may not cause any local pressure. A closely fitting singlet serves admirably. In the acute stage for some months at least the patient should not be turned frequently, once a fortnight being sufficient as a rule. He is rolled over, well supported, on his face, and the slab is lifted from his back. The skin is then tended and the plaster cleaned. Should a gibbus be present, gentle pressure may be brought to bear on it by inserting layers of cotton wool between it and the splint, the layers being generous in area and gradually increasing in thickness.

The extent of the plaster bed is determined by the site of the lesion. In all cases its lower margin reaches to the level of the middle of the sacrum. When dealing with affections of the spine below the sixth dorsal vertebræ, the upper edge should reach the base of the neck and curve forward round the shoulders. If the trouble is above the mid-dorsal region, the plaster should extend to the occiput, forming a gutter in which the neck may snugly rest.

The Time Element.

It is difficult to lay down hard and fast rules as to the length of time it is necessary to keep the patient in bed. Each case must be judged on its merits. Seldom should the period be less than two years and at least one year of complete freedom from all signs or symptoms of active disease should precede the day on which begins the great experiment—for experiment it must be, this reassumption of the erect attitude. We have at present no way of deciding just when the last tubercle bacillus is put out of action, just when it would be safe to call upon the spine to function once more to the full. Until we have some such guide, we may only play safe, allowing a liberal margin to cover up possible mistakes due to inefficiency of diagnosis. A year then is not too much. As time passes, although the patient preserves the recumbent attitude, a little more freedom is allowed him. He is frequently rolled over and left prone for periods of increasing length and later encouraged to raise his head and legs whilst in this position. These exercises will bring into action and strengthen trunk muscles which have long been inactive and have wasted. When at length it is decided to get him up, it is necessary to do so slowly and deliberately. A light but strong jacket should be fitted, those of celluloid or caseinogen being efficient. The construction of these cannot be dealt with here. The patient is first propped up a little in bed, then from day to day a little more and so on until he sits erect. In this way his vasomotor system is reeducated to function in this now novel position. The legs are exercised and so the heart is trained in preparation for the strain to be placed on it. Later, still proceeding with for the patient tantalizing deliberation, he is allowed out of bed for periods increasing in length from week to week. Gradually the different systems adapt themselves to the strains placed on them and these strains are gradually increased throughout the year. When he commences to walk the patient

should wear rubber soled shoes, crêpe rubber being excellent.

So for a year or more the experiment goes on, the reassumption of the erect attitude. If at the end of this time all is well, then the light jacket is gradually discarded and the activities of the subject are slowly increased. For years to come, indeed for the remainder of his term of life he must be made to realize that his spine is no longer in class A1, but rather C3. It must be pampered; to its demands his whole scheme of living must be subservient. He should live in the open air as far as possible and should avoid any occupation calling for excessive physical exertion. When resting he should lie rather than sit down.

CONCLUSION.

I have attempted to indicate the lines on which I consider a simple early case of Pott's disease should be treated. With the management of cold abscess I have dealt elsewhere.(1) The correction of deformity, operative fixation of the affected segment of the spine, the construction of caseinogen and celluloid jackets and the treatment of such complications as paraplegia do not come within the scope of this paper.

REFERENCE.

(1) Hugh C. Trumble: "The Treatment of Tuberculous Abscesses," THE MEDICAL JOURNAL OF AUSTRALIA, September 27, 1924, page 322.

CONCLUSIONS BASED UPON THE CLINICAL AND POST MORTEM STUDY OF EPILEPSY.[1]

By W. A. T. LIND, M.B., B.S. (Melb.),
Pathologist, Lunacy Department, Victoria.

THIS paper is based upon the *post mortem* and clinical examination of patients suffering from epilepsy in the Hospitals for the Insane. Although the patients were all epileptics who had become insane or who were congenitally insane, still all those suffering from non-congenital disease and a great number of the young epileptics who are housed in the Idiot Cottages at Kew, were regarded as mentally normal before the onset of the epilepsy. It must be conceded, therefore, that pathological changes found *post mortem* in these cases cannot be ignored when investigating the ætiology of epilepsy.

Following the shrewd example of Clouston, Kraepelin and de Fursac, I will make no attempt to define epilepsy. In this paper an attempt is made to throw light upon the causation of essential or idiopathic epilepsy and to further this attempt use is made of whatever facts are known concerning epileptoid or symptomatic epilepsy associated with the convulsions of uræmia, infancy and childhood *et cetera*. The patients whose *post mortem* findings are herein analysed, were all diagnosed as suffering from idiopathic epilepsy during life, those suffering from tumour of the brain manifesting clinically no distinctive feature from the others. The material at hand makes it possible for us to compare the pathological changes in three types of epileptics, namely: Epileptics who have become insane; epileptics who are congenitally insane; epileptics who have gross brain lesions, but are clinically indistinguishable from those suffering from so-called essential or idiopathic epilepsy. In passing, it might be stated that the types of fits in epilepsy are numerous. Gowers mentions no fewer than seventeen different types of fits in *petit mal* alone, hence the difficulty in the absence of other symptoms of distinguishing between the fits due to gross changes and those of idiopathic epilepsy.

It requires only a little study of the literature on epilepsy to bring conviction that the explanation of the disease is still nebulous. Most of the latest advances in medical science have been applied to the solution of the problem. The endocrinologists, the psychoanalysts, the vaccinators and the X ray workers all claim to have discovered something pertinent to the subject, but the medical man who has in his care the treatment of these patients in numbers, appreciates the fact that although he may know much about the clinical aspect of the disease and the appearances of the organs *post mortem*, he still confesses that the explanation of the cause of the disease is based upon hypotheses.

The conditions under which epilepsy occurs are:

(i.) Epilepsy without insanity, recovering or remaining stationary under treatment;
(ii.) Epilepsy which does not respond to treatment but drifts into insanity;
(iii.) Insanity which becomes epileptic (infrequent in incidence);
(iv.) Congenital insanity which becomes epileptic.

The first type is the one most usually seen by the general practitioner. The others are more frequently seen by the medical officers of an institution for mental diseases.

Let us for the time being put aside the details of all the valuable experimental work done by recognized authorities and make a study of the facts that we have at hand, first commencing with the Annual Report of the Lunacy Department for the year ending 1922.

These figures show that epilepsy is associated more with congenital insanity than with acquired

TABLE I.
SHOWING EPILEPTICS IN THE WHOLE OF THE VICTORIAN MENTAL HOSPITALS.

Type of Epilepsy.	Admissions.	Deaths.	Remaining on the Books.
Congenital insanity with epilepsy	30	23	199
Acquired insanity with epilepsy	19	8	299
Total	49	31	428

[1] Read at a meeting of the Section of Neurology and Psychiatry of the Victorian Branch of the British Medical Association on October 19, 1925.

TABLE II.
SHOWING EPILEPTICS AT IDIOT COTTAGES, KEW.

Type of Epilepsy.	Admissions.	Deaths.	Remaining on the Books.
Congenital insanity with epilepsy	30	23	199
Congenital insanity without epilepsy ..	88	28	683
Total	118	51	882

insanity. It also shows: (i.) That the epileptics comprise 45% of the deaths at the Idiot Cottages; (ii.) that of the total number admitted to the Cottages, 25·4% were epileptics; (iii.) that of the congenital cases on the books at the end of the year, 22·5% are epileptic.

The number of deaths in the acquired insanities during the year was 325 of which eight were epileptic or 2·4% epileptic. Of the patients with acquired insanity, admitted during 1922, there were 2·6% epileptic. Of those with acquired insanity remaining on the books, 4·2% were epileptic. Of the total number of the insane on the books at the end of the year 1922, namely 5,997, there were 7·1% epileptic.

These figures show the high death rate of the congenitally insane epileptic and they also show that the percentage of congenitally insane patients affected with epilepsy is much greater than the acquired insane affected with epilepsy.

A synopsis of the ages at death shows the following:

Of epileptic females with acquired insanity, the average age at death was 46.

Of epileptic females, congenitally insane, the average age at death was 20.

Of epileptic males with acquired insanity, the average age at death was 39.

Of epileptic males, congenitally insane, the average age at death was 21.

Of male and female congenitally insane, non-epileptic (121 cases), the average age at death was 21.

These figures show that the congenitally insane with and without epilepsy have a similarly low expectancy of life in comparison with the epileptics who are suffering from acquired insanity. Considering the risks from seizures in dangerous positions, it is extraordinary that the expectancy of life is as good as it is.

A chart made up from the combined congenital and acquired cases in which the ages of the onset of the epilepsy have been stated, shows that the fits most frequently commenced in the first year of life, then there is a sudden drop in the second year to about a sixth of that frequency. The curve persists with no alteration up till the seventeenth year, when it drops again half in frequency till the twenty-first year, after this the incidence is sporadic. A chart of acquired cases only shows that the high incidence in the first year is absent and must therefore apply only to the congenital cases with epilepsy. So far as the other ages are concerned, the onset of epileptic fits seems to be the same for congenital and acquired insanity.

As a rule the fits in acquired epileptic insanity have their onset before the individual becomes insane, but instances do occur in which patients who have been insane for some time, develope epilepsy in addition.

The chief incidence of the onset of epilepsy, except when due to trauma or tumour, is in the young and therefore unstable brain and the chief incidence of the onset of mental symptoms in acquired insanity with epilepsy is between the ages of fourteen and forty-eight with a relative infrequency in the fourth decade.

In this series of two hundred and fifty-nine, only forty-two had been submitted to the Wassermann test; twenty-two failed to react and twenty yielded a reaction (mostly feeble). An assigned cause of the first fit was given in thirty-eight out of one hundred and eighty-five males and ten out of seventy-four females. The causes given were so diverse in nature and classification that they can be disregarded as the cause of the epilepsy. Gowers says that the cause of the first fit must be the cause of the disease, but Gowers was referring to what preceded the cause assigned by the relatives, which assigned cause could happen to any individual without resultant epilepsy. Some of the reasons for the first fit were "in bed suffering from an ingrowing toenail," "death of father" (a most unlikely cause in a child of five years) and "poisoned by arsenic." The nature of many of the injuries blamed for the onset of the fit is so trivial that whatever part the actual injury had in the matter, must have been from any accompanying nervous excitement. That the onset of fits has followed fright is undoubted and authentic instances can be cited by most observers, but the emotion aroused is only the spark which fires the mine. Such little excitements as attending a concert, going to church, going to meals and getting undressed for bed, produce seizures in patients at mental hospitals and even idiots of low grade when excited at the prospect of food (probably the only emotion they know) will have a seizure. That such a degree of excitement is quite possible even with such trivial things is common knowledge to every medical man. When asking some sane patients to undress, one is struck by the manner in which they pull and tug at collar and necktie and hands shake and fumble with buttons and clothing, sometimes using enough force in their excitement to lift a ten pound dumbbell.

Injury to the head is most often given as a cause of epilepsy and in many cases in other insanities as well. This is probably the outcome of the *"post hoc propter hoc"*[2] line of reasoning common to humans. Mott states that at the Ewell Epileptic Colony 20% of the cases were attributed by the friends to injury, whereas only 0·75% were considered by the

medical staff to be of traumatic origin. In most of the cases in which friends have placed the blame for the fits at the door of a head injury, there is discovered *post mortem* a developmental abnormality or pathological change in no way associated with the usual consequence of injury.

That neuropathic and psychopathic inheritance is a potent factor in the production of epilepsy is proved by a careful study of the heredity charts of these individuals. In this series fifty-nine had inheritance of nerve or mental disease, eighteen had no inheritance evident, three were credited with the inheritance of poor stock, seven with alcoholic inheritance (some authorities claim that 50% of epileptics owe their condition to alcohol), four with syphilis, two with tuberculosis and one had a sister who had exophthalmic goître. There were no entries regarding the inheritance in the remainder of the cases. The actual degree of hereditary influence will never be ascertained so long as human nature is human nature and the desire to save the family reputation is stronger than the wish to enlighten the medical attendant. Voluble garrulity of details which have no bearing on the situation, characterize the answers to inquiries concerning hereditary influences. In *The Lancet*, October 8, 1910, Mott says:

> With regard to epilepsy, I feel convinced from my own observations and experience that Sir William Gowers is correct when he asserts that there are few diseases in the production of which inheritance has a more marked influence, and the traceable influence is always far less than that which exists. Voisin, Fère, Nothnagel, Dana, Peterson, and Aldren Turner express similar opinions.

In this series only eight are credited with subjective warnings of an approaching fit and these were more of the nature of premonitory symptoms, such as a vaguely described epigastric sensation. Only three of these were in any way similar to an aura. One with these epigastric warnings had a Meckle's diverticulum and the other an omental hernia. In passing it is of interest to note that there were four Meckle's diverticula found in this series of two hundred and fifty-nine cases which at first sight appeared abnormally large, but reference to a textbook on anatomy disclosed that one in fifty is the normal proportion, so that in reality there is no excess of this abnormality in epileptics. Objective symptoms of an approaching bout of seizures on the other hand are present in a great majority of the insane patients. These exacerbations of mental symptoms may precede, follow or as in *epilepsia larvata* take the place of a seizure.

Epilepsy may occur in individuals with very heavy or very light brains. The smallest brain found *post mortem* in this series was 115 grammes and some of the heaviest brains found in *post mortem* examination of the insane are those of epileptics. The following figures are examples taking 1,360 grammes as a fair weight of a normal adult:

1,850 grammes female epileptic, congenitally insane, aged forty-two.

1,785 grammes male epileptic, acquired insanity, aged forty-five.

1,810 grammes male epileptic, acquired insanity, aged twenty-six.

In a series of one hundred and seventy-eight congenital epileptics the brains of twenty-four were over the weight of 1,360 grammes and they were all males. The average brain weight of the epileptic idiot is less than the average brain weight of the epileptic who is not congenitally insane. The individual who becomes epileptic before full growth and does not get better, generally remains small in stature.

There seems to be no constant in the departure from the normal relative weights of the hemispheres and the rhombencephalon. Sometimes the left hemisphere is greater than the right and sometimes less than the right. The normal weight of the rhombencephalon is about one-eighth of the weight of the encephalon and the left hemisphere in the right handed man is usually five grammes heavier than the right hemisphere. In the left handed person this is said to be reversed, the right hemisphere being heavier by five grammes than the left hemisphere. In cases of acquired insanity the left hemisphere is heavier in the right handed man who has no dementia, equal in weight when there is some dementia and lighter than the right hemisphere when dementia is advanced. In the congenital insane sometimes the right side is larger than the left and the rhombencephalon is sometimes more and sometimes less than an eighth of the weight of the encephalon.

In reviewing the *post mortem* findings in two hundred and fifty-nine cases of those who have been either congenital mental defectives with epilepsy or non-congenital mental defective epileptics, it must be acknowledged that there are certain changes occurring with a frequency requiring some explanation.

The findings were as follows:

Circulatory System.

Heart normal	48
Atheroma of aortic arch	60
Atheroma of abdominal aorta	69
Acute or chronic endocarditis	74
Acute or chronic pericarditis or epicarditis	33
Thickening of coronary vessels	33
Chronic myocarditis	13
Small heart	19
Hypertrophy of left ventricle	10
Hypertrophy of right ventricle wall	9
Fat encrusted heart	2

Respiratory System.

Lungs normal	9
Bronchopneumonia	77
Pulmonary tuberculosis	27
Chronic pleural adhesions	22
Signs of suffocation during a fit	18
Acute pleurisy	16
Lobar pneumonia	19
Lungs congested	16

Emphysema was present in most chronic epileptics.

Other findings with an incidence lower than sixteen are not stated here.

Alimentary System.

(Disregarding pathological findings with an incidence lower than 6.)

Typhoid ulceration of bowel	6
Enlargement of mesenteric glands	20

Calcified mesenteric glands	6
Active mesenteric glands	7
Colitis	7
Tuberculous ulceration of bowel	6
Dilated stomach	26
Fibrosis of liver	167
Marbling of liver capsule	92
Chronic periphepatitis	23
Normal liver	8
Cholelithiasis	16
Thickening of liver capsule	11
Abnormally large liver	9
Fatty liver	10
Liver congested	13
Pale liver	17
Soft liver	23

Excretory System.

(Disregarding pathological conditions with an incidence lower than 6.)

Kidneys normal	11
Tough kidneys	196

Generative System.

(Disregarding pathological conditions with an incidence lower than 3.)

Absence of testicles	3
Old pelvic adhesions (female)	4
Infantile uterus	14
Cystic ovaries	5
Ovaries with smooth surface	8
Thick ovarian capsule	3
Generatives atrophic	3

Ductless Glands.

(Disregarding pathological conditions with an incidence lower than 3.)

Thickening of spleen capsule	21
Old perisplenitic adhesions	10
Thymus present (all ages)	15
Thyreoid fibrotic	7
Thyreoid difficult to find	6
Thyreoid normal size active[1]	39
Thyreoid inactive	34
Thyreoid large, inactive[2]	9
Thyreoid small	12
Thyreoid small, inactive	21
Thyreoid small, active	5
Thyreoid small, dry yellow, inactive	4
Thyreoid large, active	11

Nervous System.

The changes in the central nervous system except for the tendency of the congenital mental defective to have an average brain weight lower than that of the non-congenital mental defective epileptics, are practically the same for both classes. There is a difference in the pathological findings of those who owe their epilepsy to tumour.

Thickening of the dura	99
Dura thickened and adherent to the calvarium	36
Dura adherent to calvarium but not thickened	14
Pia thickened	127
Pia thickened and adherent	20
Sclerosis of *cornu ammonis*	37
Hypergliosis of brain	63
Ventricles dilated	134
Ependyma of lateral ventricles granular	4
Ependyma of lateral recess of 4th ventricle granular	16
Ependyma of *calamus scriptorious* granular	18
Abnormality of brain pattern	80
Hydrocephalus ex vacuo	20
Plaques Jaunes	11
Tumour of brain	9
Cerebral softenings	17
Pachymeningitis hæmorrhagica	6
Atheroma of vessels of brain	23
Macroscopical changes in chorioid plexus	7
Trephine operations	7
Flattened convolutions	8
Heterotopia	2
Internal hydrocephalus	1
True porencephaly	1
False porencephaly	1
Asymmetry of hemispheres	15
Gross wasting of gyri	71
Old lesions in the brain substance not determined	7

[1] Active = glistening on section.
[2] Inactive = dull and fleshy on section.

The outstanding feature of these findings is the indication of chronic irritation. There is no evidence that changes in the endocrines are the cause of epilepsy, although some authorities lay stress on the persistence of the thymus in epilepsy. Although the generative organs manifest abnormalities in some of the congenital cases, they are not frequent enough to be regarded as any more than developmental stigmata peculiar to that group of insanity. About 10% of the patients were tuberculous, but tuberculosis is very common in the congenital insane. The high incidence of bronchopneumonia is probably due to insufflation and unconsciousness during bouts of seizures which occur with great frequency, for example: "Thirty fits in a morning"; "Forty-seven fits in a day"; "Average twenty-three fits a week"; "Average three or four fits a day"; "Took fits thirty per hour till he died."

Emphysema of the lungs in the chronic epileptic is almost constant and is regarded as syphilitic by some and as being due to the effect of seizures by others. The most striking pathological changes found are the unusual toughness of the liver, kidneys, spleen and brain tissue. In the circulatory system the thickenings, adhesions and atheromatous changes in persons quite young all point to the presence of an irritant in the circulation. In the brains of these individuals there are changes which can also be justly attributed to chronic irritation. As the glial tissue in the brain is the connective tissue of that organ, it is not surprising to find general hypergliosis of the brain or localized hypergliosis such as thickening of the *cornu ammonis* or granularity of the subependymal layer of glial tissue forming the innermost lining of the ventricle. Sometimes, without being due to juvenile general paralysis of the insane, this granularity of the ependyma affects the floor of the *calamus scriptorius* as in parasyphylitic disease which has always tended to make syphilis suspect in the ætiology of epilepsy. As the patients studied *post mortem* had suffered from epilepsy for varying periods, the degree of induration found in the organs naturally varied. Sometimes the sclerosis appears worst in the cardiac valves, sometimes worst in the kidneys, sometimes worst in the liver and sometimes worst in the brain, but in addition to the acute terminal illness there is always found this sclerosis in one or more of the organs mentioned and more often in several than in one. The most common finding is the sclerosis of the kidneys, liver and brain. The evidence of the pathological changes in epilepsy can thus be said to be indicative of chronic irritation. The thickening of the dura and pia arachnoid are also a response to chronic irritation or congestion. In this series of *post mortem* examinations there are

two classes characterized by fits clinically indistinguishable from ordinary epilepsy with insanity. Epiloia is one and tumour of the brain is another. In epiloia there is a hypertrophic sclerosis of the convolutions associated with *adenoma sebaceum* and growths in the kidneys. Apart from these changes the pathological findings in this condition manifest practically the same signs of chronic irritation in the liver, kidney and circulatory systems as are found in the *post mortem* examination in epilepsy known as idiopathic. In the tumours included in this series, any changes found in the liver, kidneys *et cetera post mortem* are not out of proportion to the age of the patient as is the case in the idiopathic epileptics. That this fibrosis of the organs is sometimes due to syphilis is practically certain, as the following pathological findings in two sisters show. One is epileptic and the other non-epileptic. It may be possible that the second patient may have developed epilepsy if she had lived long enough, but all evidence is against that probability. They both show the same type of pathological changes and one of them reacted to the Wassermann test. The other had not been examined by the blood test.

E.J., a female, aged ten years, was admitted to the Kew Cottages on January 7, 1908, as an epileptic imbecile. She was sent from school because she could not speak properly. She had some intelligence, but was partly paralysed. She died on December 9, 1917.

Post mortem examination was carried out on December 10, 1917. The body was that of a girl, nineteen years of age, contracted and emaciated. The aortic arch was clean. The abdominal aorta was atheromatous. The heart was small and the valves sclerosed. The left lung was the seat of bronchopneumonia. The liver was small, tough and its capsule was marbled. The generatives were infantile, but pubic hair was present. The kidneys were small, tough and stripped cleanly. The calvarium contained nodes. The dura was thick but not adherent. The pia was thick and œdematous. The gyri were wasted. All the ventricles were dilated. Granules were present in the fourth ventricle. A Wassermann test was not carried out.

S.J., a female, aged ten years, was admitted to the Kew Cottages on April 23, 1912, as an imbecile, not epileptic. A response was obtained to the Wassermann test. She died on October 31, 1918.

Post mortem examination was carried out on October 31, 1918. The body was that of a female, deformed and contracted. The aortic arch was clean; atheroma of abdominal aorta was present. The heart was small and mitral stenosis was present. The spleen was tough and its capsule was thick. The thyreoid gland was hard and glistening. Both lungs were tuberculous and bound down by chronic pleural adhesions. The liver was tough. Perihepatitis with adhesions was found. The kidneys were tough. Tuberculous peritonitis was present. The pelvic organs were bound down *en masse*. The calvarium was normal; the dura was thick and the pia œdematous. Wasting of gyri and sclerosis of cortex were found. Extreme dilatation of ventricles was present. The vessels were normal. The ependyma was normal. No gross lesions were found on section.

The following three cases are those of two sisters and a brother and show how epilepsy may occur in a family in which other members are idiot but not epileptic.

One sister died from hydrocephalus at the age of nine weeks. S.B., a brother, not epileptic, but a crass idiot, died at Kew Cottages on September 5, 1898. The *post mortem* notes record the brain substance as hard and the membranes thickened. The other organs were fairly healthy.

One sister, E.B., aged four and a half years, was admitted to Kew Cottages on December 8, 1893. Both sides of her skull were trephined when she was three years old (apparently an attempt to improve the mental condition). She became epileptic after the trephining. She was a low class idiot, unable to feed herself, to talk or to attend to herself. She died on June 3, 1918.

Post mortem examination was carried out on June 4, 1918. The body was that of a microcephalic female with contracted legs. The arch and abdominal aorta were clean. The heart was small and the spleen tough. The thyreoid was small, but its appearance was normal. The lungs were bronchopneumonic and emphysematous and had strong pleural adhesions. The suprarenals were small. The liver was firm. Chronic adhesions were found around the gall bladder. The kidneys were tough and the cortex a good width. The capsule was found to cling to the cortex. The generatives were atrophic and the pubic hair developed. Sclerosis of brain tissue was found, the ventricles were dilated, no granules of ependyma were found. The dura was thick and the pia was thick. Heterogyria was present. Trephine windows were present in the calvarium.

In both these cases sclerosis of the brain was present, but in the epileptic in addition fibrosis of the kidneys and a slight degree of fibrosis in the liver were found.

The next two cases indicate the presence of toxæmia in a brother and sister, the brother dying from epilepsy at the age of thirty-eight and the sister dying at Kew from acute confusional insanity.

The notes of the sister's case are as follows:

E.T. was admitted to Kew on September 3, 1915. She was married and twenty-nine years old. Her youngest child was seven months old. Duration of present symptoms was seven days, but during last two months had been having a numbness as if the body were dead. She had also had some mental symptoms about two years previously. The urine contained albumin. On September 20, 1915, she looked bilious and was vomiting everything. On September 26, 1915, in spite of treatment the vomiting continued and she died.

At *post mortem* examination a septic finger of the right hand was found. Linear atheroma of arch and abdominal aorta was present. Hypertrophy of heart was present. The liver was tougher than normal. The thyreoid was active The lungs were tough. The stomach was dilated and full of fluid. The bowels were congested. The kidneys were tough. The ovaries had a smooth surface. The inner plate of the calvarium was thickened and adhesions to the *dura mater* were found. The meninges were congested. China white appearance of medulla of hemispheres was found.

The *post mortem* notes in this case indicate a chronic toxæmia.

The next two cases are those of a brother and sister, both epileptic and idiot. They were both epileptic from birth and the *post mortem* findings were identical.

K.L., a male, aged two years, was admitted to the Kew Cottages on August 20, 1918. He was quite devoid of intelligence, had had fits from birth and died on August 19, 1918.

At *post mortem* examination the brain weight was one hundred and fifteen grammes, the smallest on record in the annals of the Victorian Lunacy Department. It and the brain of the sister may be seen at the Melbourne Medical School. The thyreoid was small, but active. The liver was very tough, pale and not marbled. The kidneys were very tough, the capsule stripped smoothly. The dura was very thick, the pia was not thick. The spleen was tough. The primary fissures of the brain were primitive. Tuberculosis of the lungs was present.

J.L., a female, aged two years, was admitted to Kew Cottages on August 17, 1920, having been an elileptic since birth. She died on September 17, 1920.

At *post mortem* examination the brain weight was one hundred and fifty grammes, the smallest but one on record. The lungs were bronchitic and emphysematous. The liver was tough and not marbled. The peritoneum was tough. The kidneys were tough. The generatives were normal. A large pituitary gland was found. Maldevelopment of brain similar to that of the brother was present with ape like primary fissures and the secondary fissures inhuman.

On referring to "Special Pathology and Therapeutics of the Diseases of Domestic Animals," by Dr. Franz Hutyra and Dr. Josef Marek, the following was noticed:

Nothing definite can be said of the frequency with which epilepsy occurs in domestic animals, as it is often impossible to show that a given affection is chronic, and because the appearance of acute epilepsy or of epileptiform convulsions in other diseases cannot always be determined. Dogs are affected most frequently, cattle less often. Hogs and horses are affected only in exceptional cases. The disease is not infrequent among birds, occurring in parrots, canaries and turkeys.

Reynal reported hereditary transmission of epilepsy to all young of three litters of an affected cat. La Notte observed the disease in two herds which descended from an epileptic steer. Cruzel saw it in three calves which had an epileptic mother. Otto reported the disease transmitted by a bitch to two pups. Dr. Robertson, the Chief Veterinary Officer of Victoria, says:

Personally I have never seen a case of idiopathic epilepsy in any animal. Epileptic convulsions, of course, are common, but I think they are of toxic origin.

Dexler and Cerletti saw in two epileptic dogs old, small encephalic foci and disseminated or diffuse sclerosis arising from them. The first attack may occur without any demonstrable factor or cause, but fright, excitement or punishment or bright light may contribute. Epileptoid seizures differ in that they occur only in manifestations of cerebral or other organic disease and disappear after the removal of the primary affection such as worms or fæcal impaction. It thus seems that in common with humans the animals have epileptic and epileptoid or epileptiform convulsions and the facts and information concerning them seem to be practically the same.

The epileptoid convulsions in humans are those that occur in the intestinal irritation of infancy, the ingestion of unripe fruit by children, onset of pneumonia, scarlatina, fright and worms, also in cases of chronic alcoholism, eclampsia, chronic kidney disease and general paralysis of the insane. When certain factors such as the constipation in the general paralytic and the green fruit in the child can be removed, the convulsions cease. In the case of the general paralytic the convulsions may again occur when the bowel becomes again packed with scybalæ and should death occur a patch of ecchymosis, the so-called flame shaped congestion, is seen in the pia arachnoid covering the hemisphere in the motor area apparently the result of increased intracranial blood pressure. In true epileptic convulsions there are periodically occurring seizures with no manifest cause, whereas the epileptoid fit can usually be ascribed to something quite manifest. Active local disease apart, such as acute meningitis, what part does the packed large bowel in the general paralytic or the onset of one of the exanthematous disease play in the production of the epileptoid seizures? If that question can be solved, it will make the task of the solution of the cause of idiopathic epilepsy much easier. The *post mortem* examinations reveal that in chronic epileptics there is evidence of a chronic toxæmia causing thickenings of the tissues in general, especially the heart, liver, kidneys and brain. The more chronic the condition, the more the thickening. Apparently this toxæmia is only temporary in the epileptoid. Heredity, youth and chronic changes in the organs are found to be present in this series of idiopathic epileptic patients and heredity, youth and some acute irritation are the factors present in those who have epileptoid seizures. It appears, therefore, as if the following comparison can be made:

Epileptoid.	Epileptic.	Tumour.
(i.) Heredity (ii.) Youth (iii.) Acute peripheral irritation or intoxication	Heredity Youth Chronic intoxication, irritation or excitement	Local irritant, excitement

In epileptoid and epilepsy, the factors (i.) and (ii.) are admittedly present, so that it is item (iii.) which requires explanation.

Take for example the infant who has ingested something unsuitable and has convulsions as the result. Is it the irritation of the alimentary tract which has raised the irritability of the central nervous system to such a degree that one of the pulsations of the cerebral circulation acts as a stimulus to the cortex, already compressed to a dangerous state causing general convulsions? Or is it the production of toxins through indigestion that causes the same degree of irritability? Apparently both can do this, because both phymosis and the onset of scarlatina may produce epileptoid seizures. It is known that if a fly crawls over the ear, when a patient is being examined for the knee jerk reflex, the reflex is increased by the peripheral stimulation of the fly's legs. It appears also that the products of indigestion have the same effect. In the epileptic we find item (iii.) acting in the same manner as in the epileptoid, only with periodical recurrence. But the epileptic has chronic changes in the liver, kidneys and brain in addition to item (iii.) of the epileptoid and it appears as if this additional factor produces essential epilepsy. That seems to be as far as the *post mortem* evidence carries us. There is a chronic intoxication going on in the body of the epileptic, but whether the irritant is bacterial or metabolical or both cannot be determined. The changes are more like syphilis than any other dis-

ease and syphilis in many cases probably intensifies the condition, but evidence concerning the whole part played by syphilis in this disease is not conclusive.

Now extend the inquiry to see in what way tumours cause fits and compare the explanation with the epileptoid and the epileptic. A tumour of the brain, whether in the cortex or in the interior of the brain, can cause periodical fits. This is considered to be from intracranial pressure causing cortical anæmia. This degree of intracranial pressure, therefore, must be periodical as the fits are periodical. The tumours do not get bigger periodically, so it must be the other contents of the skull which at times become so increased in volume as to make conditions suitable for a seizure to take place. In time of sleep the brain is smaller in volume and when a button is removed in trephining, the brain is seen to pulsate into the opening with every heart beat. In the case of tumour the brain actually bulges into the trephine opening. It is thus certain that the volume of the brain is capable of alteration. It is considered that mental excitement with its effect upon the brain circulation increases the volume of the brain. The capacity of the skull, however, is constant. The blood supply of the brain is not like that of any other part of the body. According to Tilney and Riley "the efficiency of the system for conducting the blood into the skull, and the mechanical deficiency of vascular distribution within the brain are remarkable." The veins do not accompany the arteries and are thin and have no valves. They also run into the sinuses in a direction opposite to the current. The pial arteries lie unsupported by tissue as arteries do in other parts of the body and the cortical arteries are surrounded in the brain by perivascular sheaths full of cerebro-spinal fluid which keeps them from direct contact with the brain tissue. The sinuses have rigid walls and have connected with them a system of lacunæ which act as reservoirs and safety valves, preventing undue filling and distension of the sinuses, meningeal veins and cerebral veins by diverting the blood into extracranial channels such as the diplœ and emissary veins. Then in addition there is the cerebro-spinal fluid system which varies in quantity with the arterial pressure. The whole arrangement is boxed up in an unyielding skull, so that the pulsations of the arteries are communicated to the whole brain and the venous flow from the cranium. The vasomotor supply does not appear to have any definite action, although it is claimed that a vasomotor supply to the pial arteries has been discovered. This system regulates the intracranial pressure under normal conditions and it can accommodate itself to conditions of physiological excitement. In pathological conditions (such as tumour) at times of extra excitement and increased blood pressure the limit of accommodation to pressure is reached and the brain tissue, especially that near the tumour, suffers from pressure anæmia which causes a seizure. In the case of a tumour or spicule of depressed bone the seizure may be a local one without unconsciousness, the so-called Jacksonian type and spreads in a march as the pressure anæmia extends from the local foreign intruder. Should the pressure still increase, the other side of the brain may be involved and unconsciousness ensue. This pressure anæmia of the cortex may be exemplified by tying a ligature around the thumb and pressing on the congested surface with a piece of glass, when the skin surface appears blanched. The cerebral cortex has five times the blood supply of the medullary portion so that any intracranial pressure will be most severely felt by the cortex which contains the nerve cells. In support of this theory, it is known that the seizures of general paralysis of the insane may be either epileptoid or apoplectic with actual rupture of the blood vessels, although as a rule they are epileptoid or apoplectiform, probably because of the peculiarity of the cerebral vessels of the general paralytic being always in good condition, while the arch of the aorta is always diseased. It shows, however, that it is increased intracranial pressure that causes the seizure in general paralysis of the insane. In the case of the epileptic and the epileptoid the presence of the predisposing heredity, the peripheral irritation or toxæmia, causes an increased irritability of the cerebral cortex which requires only the extra stimulation of the pulse beat upon an already compressed cortex to produce the same effect as a mechanical irritation of the cortex. In many of the epileptics in addition to this there are sclerosed areas which will not expand and when the brain increases in size under the influence of the increased blood supply, these sclerosed areas cause a certain degree of puckering which also acts as a mechanical irritation. The very irritable state of the cortex will favour the spread of the initial cortical stimulus right through the brain by medium of the association and commissural fibres with, so far as our purpose is concerned, instantaneous rapidity and a generalized seizure results. In the case of the epileptoid the conditions in favour of fits are not so overwhelming, so that when the causative factor is removed, for example, worms or undigested food, the fits cease, but in the epileptic who possesses the factors (i.), (ii.) and (iii.) in a greater degree, the seizure repeats itself periodically, whenever some emotion increases the intracranial pressure and following a recognized rule this pathway is more easily followed on each successive occasion, until the habit is well established. Experience goes to show that early epilepsy may clear up when the toxin has been removed by suitable treatment and the irritability of the cortex lessened by sedative measures. When this cannot be done the toxin produces chronic changes in the organs and tissues of the body and the fits continue permanently.

According to Dr. J. Bostock there was a history of some form of epilepsy in 30% of the aboriginal inmates of the Claremont Asylum, Western Australia, compared with 10% in the case of the whites. This is due according to Dr. Bostock's opinion to the introduction of the blacks to fresh protein in the white man's food to which they were not

accustomed. In other words, the condition is due to what is to the aboriginal a toxin. If this line of reasoning be correct (I do not claim that it is impregnable to criticism) then idiopathic epilepsy is due to heredity, youth or immature nerve tissue and intoxication. The first two are apparent. The toxæmia is suggested by the chronic indurative changes in the kidneys, liver and brain principally. These in turn add to the retention of irritant substances in the blood to such a degree that cure of the epileptic condition is impossible and the patient becomes permanently epileptic. This chronic intoxication may go further, as it often does and produce insanity. Up till the time of the production of indurative changes in the organs the epilepsy is probably curable. The actual exciting cause of the fit is an emotional or sensory stimulus causing increased cerebral pulse tension which mechanically stimulates the cortical cells. The chronic changes in the liver, kidneys and brain are found most commonly in epilepsy with congenital insanity and the figures already quoted from the Annual Report for 1922 show that epilepsy is more common in congenital insanity than in the acquired types of insanity in the ratio of 25·4 to 2·6. The relationship between epilepsy and congenital syphilis awaits the determination of the relationship between congenital syphilis and congenital insanity.

Of the prognosis in epilepsy Hippocrates said:

> The prognosis in epilepsy is unfavourable when the disease is congenital and when it endures to manhood and when it occurs in a grown person without any previous cause.

In other words, the "congenital case" is due to some severe changes in the brain and other parts of the body of an incurable nature and when it "occurs in a grown person without any previous cause" it is nearly always due to tumours or other gross pathological changes. "And when it endures to manhood" simply means that the prognosis is bad, because the causative agent has produced changes that cannot be altered by medical means; they can only be smothered up by sedatives in some cases or kept in bounds by dieting and open air occupation without excitement. Most medical men can recall experiences of incipient epilepsy clearing up under the judicious administration of bromide and arsenic combined with regular bowel movement, dieting and the avoidance of excitement. Apart from starvation and enemata during a succession of fits, the drugs which have been discovered empirically to be the most successful in the treatment of epilepsy are those which act as nerve sedatives and soften the force of the pulse. Thus the purgation and starvation with only water by the mouth to eliminate toxins and reduce the pulse tension, the nerve sedatives to relieve the cortical irritability and the vasodilators to reduce the intracranial pressure all seem to indicate the causes suggested by the *post mortem* findings and the study of these statistics and clinical facts.

Reports of Cases.

PNEUMOCOCCAL PERITONITIS SIMULATING STRANGULATED INGUINAL HERNIA.

By HILDA E. KINCAID, D.Sc., M.B., B.S. (Melbourne),
Senior Resident Medical Officer, The Renwick Hospital for Infants, Sydney.

BABY M.L., two weeks old, was admitted on November 28, 1925, with a swelling in the right side of scrotum. The mother said the child had been restless for the previous three nights, but she had noticed nothing abnormal until 9 a.m. on the day of admission when she bathed it. She then found a large red swelling in the scrotum. The child had vomited three times since then and had passed slightly coloured mucus *per rectum* three times.

On admission the temperature was 37° C. (98·6° F.), the pulse rate was 150 and the respiratory rate 50 in the minute. The heart and lungs were normal. The abdomen was very slightly distended, there was no rigidity. The right side of the scrotum was enlarged, red, tense, fluctuant, tender, dull, there was no impulse on coughing; the swelling appeared to be continuous with a thickening in the inguinal canal. A large area of redness with a definite edge was present on the left buttock. The child died soon after admission.

On *post mortem* examination the scrotum was found to be a bag of pus which had apparently tracked down from the abdomen; the abdomen contained a large quantity of pus. Smears of the pus contained numerous pneumococci. Heart and lungs were normal.

Reviews.

LISTER'S REDISCOVERY OF THE LIGATURE.

"LISTER AND THE LIGATURE," a brochure of ninety-four pages is of unusual interest.[1] It is apparently a trade publication of a well known American firm without an advertisement! It is further a genuine literary research into the modern rediscovery of the ligature by Lister and his conquest by antiseptic methods of the dreaded secondary hæmorrhage.

In 1868 first with silk and then with catgut steeped in carbolic acid Lister successfully ligatured large blood vessels. Apparently this was preceded by the use under Syme of the silver suture popularized by Marion Sims. The failure of silk Lister considered as due to its absorbability of organic material which decomposed. In 1865 carbolic acid used in compound fractures had insured rapid healing and the study of the healing process led Lister to use animal material for ligatures.

Not for twenty years, not indeed till the old school of surgeons had died out and the younger men had taken their place, were Lister's principles accepted and it was France and Germany which led the way.

The ideal suture material we are told should be sterile, absorbable in definite measurable degree, fine and sufficiently strong and pliable and catgut is claimed as best fulfilling this requirement.

The book sketches fairly adequately the pre-Listerian experience, the story of Lister's own time and after Lister.

Lister himself produced no textbook, but wrote many papers and gave many addresses on surgery. Extracts are given from his writings concerning the ligature and a complete bibliography is supplied. Both of these should be invaluable to those interested in the rise of modern surgery and in the history of our own times in medicine. The few illustrations are most interesting and include a late photograph and the Westminster Abbey medallion. The description of this great man whom we know as Lister

[1] "Lister and the Ligature," Compiled by the Research Readers of the Scientific Department; 1925. New Brunswick; Johnson and Johnson. Demy 8vo., pp. 89.

or Lord Lister, as Sir Joseph Lister and Joseph Baron Lister, appears merely pedantic.

The book, however, is delightful reading and both the anonymous research readers and the great firm with which they are associated deserve thanks for this admirable publication.

MEDICINE AND AVIATION.

"AVIATION MEDICINE" by Dr. Louis Hopewell Bauer, Commandant of the School of Aviation Medicine, United States of America, is a very welcome volume covering faithfully all the literature on the subject.[1] It is particularly interesting as a record of the valuable research work at the School of Aviation Medicine and as voicing the opinion of observers in the United States on the various debatable subjects.

Aerial combat makes large demands on a man's reserve of mental and physical power. Flying calls for special physical attributes. The book is the outcome of the attempts to select the right men by medical examination, as difficult a task as to select first class cricketers by the same means.

The aim of any air service is to secure men who will have a long flying life. Training is expensive and arduous; men have to be excluded who, though they may easily learn to fly, are likely to have to give it up as they grow older owing to some physical disability.

Bauer joins in the universal opinion that sight is of supreme importance. Depth perception, dependent upon good ocular muscle balance, is the keynote of success. "Latent hypermetropia of more than one diopter should disqualify." British standards allow up to two diopters of manifest hypermetropia. In connexion with night flying, stress is laid not only on normal colour vision, but also on normal peripheral colour fields.

Generalizations are proverbially dangerous. It is certainly not our experience that "all aviators become deaf," as is stated, but one is inclined to agree that as regards the much discussed semi-circular canals "the hypersensitive is a much poorer risk than the hyposensitive."

A chapter is devoted to reaction time. Simple reaction times to optical, auditory and tactile stimuli are not believed to be of any value. The Reid machine and Ruggles orientator, it is stated, while still in the experimental stages, hold out hope of being useful.

The altitude section will be of general interest. The Henderson rebreather, though rather complicated, seems to offer the best altitude test other than the low pressure chamber.

As regards civil aviation, the United States has not ratified the international requirements for air navigation. Apart from Army, Navy, Marine Corps and Post Office, pilots are not medically examined for civil licences. It is interesting to learn that Dr. Bauer considers this situation as ridiculous.

The book should prove a great stimulus to all interested in the care of flying personnel. Full details are given in all branches of the subject.

CYSTOSCOPY.

BE it stated at the outset that "Operative Cystoscopy" is a monument to the industry and ability of the author and of the artist who illustrated the work.[2] The bulk and unwieldiness of the volume could have been considerably curtailed and its usefulness to a like degree enhanced.

As the book contains nothing that is particularly new or contentious and is more or less a reflex of current urological cystoscopic practice, it is unlikely to find favour amongst the specialists. The beginner will find his needs amply satisfied by works of much smaller dimensions.

While the cystoscopic plates illustrate the various lesions as well as any that have yet appeared, the needless multiplication of them leads only to boredom and *ennui*.

It is scarcely a book that is likely to find its way to the book shelves of the discriminating purchaser.

A MANUAL ON PHYSIOLOGY.

IN the preface to his "Textbook of Physiology" Professor Zoethout makes the following comment: "While the author does not believe in making the road in science such that, once started, the student never can stop because of the total lack of resistance, yet unnecessary ambiguity of rhetorical construction never commends itself. Clearness of expression has been striven for."[1]

Despite this inauspicious introduction the book can be commended as giving an admirable presentation of human physiology to those who are not actually engaged in the study of medicine, human or veterinary. This volume stands midway between the larger manuals and the secondary school textbook and is suited for various non-medical courses.

The exposition is well ordered and exceedingly lucid, whilst a special feature is the application of physiology to personal hygiene. Those portions which deal with muscular exercise, are indeed superior in treatment to corresponding chapters in many more pretentious works. One criticism that can be advanced, is that the author leans towards vegetarianism and quotes rather uncritically some alleged dangers of a liberal meat diet. A little reflection would have saved him from the curious statement that the Roman soldier won his victories on "maize and oil." The illustrations though familiar, are serviceable. There is a good subject index.

SYDENHAM.

DR. RIESMAN'S short memoir of Thomas Sydenham is an expansion of an article published in the June number of the *Annals of Medical History* for 1924.[2] The author is one of the rapidly increasing number of those members of the medical profession who are interested in the history of medicine.

The book forms a welcome addition to the valuable series of historical monographs published during the last few years by Mr. Paul Hoeber, of New York.

During 1924 the medical profession throughout the world celebrated the tercentenary of the birth of Sydenham. Dr. Riesman in his preface states that Sydenham's fame "consists in being the representative of the clinical or bedside approach to the problems of disease."

Sydenham threw aside the foolish and absurd methods of his time and based his treatment on facts observed by his own eyes. His description of gout from which he was a sufferer, is a classic; in addition, his descriptions of chorea, scarlatina, broncho-pneumonia and hysteria can still be read with advantage.

Sydenham made an epoch in the history of medical science and is recognized as the founder of clinical medicine.

The book is handsomely produced and is illustrated by a portrait of the "English Hippocrates" and a reproduction of the title-page of the first English translation of his works, dated 1696.

The reading of this memoir can be strongly recommended to the profession, especially to its younger members, who are inclined to depend on the laboratory and the X ray room for diagnoses. They would realize the brilliant results that can be obtained by a general practitioner who uses and developes his powers of observation.

[1] "Aviation Medicine," by Louis Hopewell Bauer, A.B., M.D.; Published by authority of the Surgeon-General; 1926. Baltimore: The Williams and Wilkins Company. Royal 8vo., pp. 256, with illustrations. Price: $7·50 net.

[2] "Operative Cystoscopy," by E. Canny Ryall, F.R.C.S.; 1925. London: Henry Kimpton. Royal 4to., with 115 plates containing 670 illustrations. Price: 70s. net.

[1] "A Textbook of Physiology," by William D. Zoethout, Ph.D.; Second Edition; 1925. St. Louis: The C. V. Mosby Company. Demy 8vo., pp. 616, with illustrations. Price: $4.50 net.

[2] "Thomas Sydenham, Clinician," by David Riesman, M.D.; 1926. New York: Paul B. Hoeber, Incorporated. Post 8vo., pp. 52. Price: $1.50 net.

The Medical Journal of Australia

SATURDAY, AUGUST 21, 1926.

The Profession and the Public.

In a few days the Federal Committee of the British Medical Association in Australia will hold its half-yearly meeting. The Committee exists for the purpose of coordinating the work of the several Branches of the Association in the Commonwealth and of taking any action that may be necessary to further the objects of the Association. It has no power of initiation. Matters referred to it by the Branches are investigated and its resolutions on these matters must be submitted to the Branches before they can become the considered opinions of the Association in Australia. These matters usually have to do with the relations of the medical profession to the public. Some of them concern the public only in so far as the conditions under which individual services should be rendered, are prescribed. It is the duty of the profession to take steps to insure that medical treatment, preventive measures and precautionary supervision of the health of the people are carried out efficiently and in accordance with the scientific knowledge of the day. In order that this may be done, the profession finds it advisable to introduce some uniform regulations. These regulations have the object of eliminating competition of a purely financial nature between practitioners and of indicating the conditions under which satisfactory work can be conducted. The Branches of the British Medical Association are not concerned with the fees charged by medical practitioners or with the arrangements existing between them and their patients.

Of far greater importance are those matters that arise in connexion with the maintenance of the public health and with the elimination of disease. Unfortunately the public is apt to misunderstand the aims and arguments of the Federal Committee and of the Branches. The British Medical Association in Australia has never taken the public into its confidence, with the result that a mistrust has arisen. Stray facts have escaped and have at times given credence to the assumption that the British Medical Association is concerned only with the interests of its members. Some of the Branches endeavour to conduct their business behind closed doors. The Councils of these Branches find it advisable to leave their members uninformed concerning the work until the annual reports are presented. The argument is used that if negotiations take place with public and quasi-public bodies, the previous publication of the policy of the Branch would weaken its position. Such an argument does not savour of sweet reasonableness, but rather of hard bargaining. The Victorian Branch formerly published in the columns of this journal a sort of interim report from time to time. The South Australian Branch has recently introduced the practice of publishing information from the records of the Branch Council on matters concerning the profession in its relation to the public. The Federal Committee publishes a summary of its proceedings as soon as possible after each meeting. All these published statements, however, are addressed to the members of the Association, and are given in a manner that renders them more intelligible to the members than to the public. It must not be forgotten that the British Medical Association is a democratic institution and that its government is in the hands of the Representative Body, a parliament comprised of one member elected to represent each Division or unit of the Association. Each representative is supposed to have been instructed on all questions about to be discussed by the members of his Division. A full report of the Representative Meetings is published in *The British Medical Journal* and information of general interest is handed to the lay press. The Council of the British Medical Association, though merely an executive body, publishes a record of its deliberations.

There is need for greater activity of the Branches of the British Medical Association in Australia in regard to the prevention of disease and the improvement of the public health. The profession must be more constructive in its policies in the future than it has been in the past. That a wider sphere of utility is contemplated is evident from the fact

that the Branches have sought and obtained power to become autonomous bodies, incorporated under the local *Companies Acts*. The Council and Representative Body have also modified the constitution of the Association to enable a Federal Council to assume complete autonomy and to be registered as a company. If this development is to result in the shouldering by the medical profession of larger responsibilities in the campaign against disease, it will be essential for the various councils of the representative organization to inform the public what has to be done and how they propose to do it. We venture to question the polity of a policy of secret counsels.

Current Comment.

A DEFENSIVE MECHANISM OF THE PARAMETRIUM.

INFLAMMATION is not a disease. It is a defensive reaction on the part of the organism to the invasion of the tissues by an extraneous body, be that body an inanimate substance or a living bacterium. In the inflammatory process, phagocytosis plays an important part. The presence of microorganisms within the cells of human tissues was observed as early as 1870. At first it was thought that the engulfment of bacteria by leucocytes was merely a means of their transportation from one part of the body to another. The first to suggest that the process was in any way concerned in defence was Panum; he regarded the defensive nature of the phenomenon, however, as merely a possibility. It remained for Metchnikoff to establish the possibility as a certainty. In his earlier studies Metchnikoff watched the effect of the introduction of yeast cells on a small crustacean. A struggle occurred between the leucocytes of the crustacean and the yeast cells. He found that the animal was protected if complete enclosure of the yeast cells in the leucocytes occurred. If engulfment of yeast cells did not take place, disease and death followed.

It is obvious that phagocytosis of a bacterium is not a simple process. There is something more than the introduction of a bacterium and its ingestion by a leucoctye which happens to be in the vicinity. The first phase of phagocytosis consists in the motion of the leucocyte towards the invader. It was held that the stimulus occasioning the movements of the leucocyte is chemical in nature and the phenomenon was spoken of as chemiotaxis. The stimulus does not always have the effect of attracting a leucocyte, sometimes the latter is repelled. This has given rise to the terms positive and negative chemiotaxis. If a bacterium exerts a positive chemiotaxis towards the leucocyte, phagocytosis of the bacterium occurs, regardless of the question as to whether or not the leucocyte is able to digest the bacterium. At the same time there is probably an associated biological factor to be considered. It has been shown that in some infective diseases, such as tuberculosis and cerebro-spinal meningitis, the bacterium which is an indigestible parasite, exerts a positive chemiotactic influence upon the leucocyte. In these circumstances the bacterium may continue its attack and ultimately destroy the leucocyte. In cerebro-spinal meningitis the leucocytes in the naso-pharynx engulf the bacteria and pass by way of the mucous membranes and lymph channels into the blood stream. The bacteria in the meantime are carrying on the assault on their hosts, the leucocytes are ultimately disintegrated and the microorganisms are set free to continue their malign influence in the body—the leucocyte has served as a carrier for the bacterium.

It will thus be seen that the truth lies midway between the two views, namely, the old view that the leucocytes serve purely as carriers, and Metchnikoff's view that phagocytosis constitutes the chief protection of the body against bacterial invasion. D'Herelle claims that a bacterium is pathogenic for an individual if it exerts a negative chemiotaxis on the leucocytes or if, being ingested, it resists digestion. In other words pathogenicity is determined by the possibility or impossibility of phagocytosis, phagocytosis being regarded in its complete nature as beginning with positive chemiotaxis and after engulfment of bacteria concluding by their digestion.

Metchnikoff explained many of the degenerative and retrogressive processes in the body as being due to phagocytosis. The involution of the puerperal uterus has been explained in this way and Helme in 1889 published work pointing to a phagocytosis of hyperplastic uterine muscular tissues at this time. Moreover, the part played by leucocytes in puerperal sepsis is generally recognized. In fact reference to the "leucocytic barrier" in this connexion has become so general that the phrase is stereotyped. Comparatively few observations on the part played by the "leucocytic barrier" have been undertaken. This fact has been emphasized recently by Dr. J. Hofbauer in a study of the defensive mechanism of the parametrium during pregnancy and labour.[1]

Dr. Hofbauer's investigations were carried out in an attempt to obtain information as to whether there exists in the tissues immediately involved in the resorption of bacteria during labour a mechanism adapted to repelling their invasion. He points out that much attention has been given to the part played by the parametrium in the dissemination of malignant disease of the *cervix uteri* and that but little has been done on this structure in connexion with the puerperal state. He has subjected a series of forty-three specimens to microscopical examination. The tissue examined was that situated at the base of the broad ligament and the specimens were obtained at operation on patients in various stages of pregnancy and labour and on

[1] *Bulletin of the Johns Hopkins Hospital*, April, 1926.

patients who were not pregnant. The parametrial tissue of uteri in the third month of pregnancy manifested an increase in the number of cells when compared with the tissue from a non-pregnant uterus. Transitional forms were present and in some instances the cytoplasm was more voluminous; at the same time the outlines of the cells were ragged and irregular.

In uteri removed in the sixth month of pregnancy a further increase in the cells of the parametrium was found. Lying in groups of five or six, they presented all the transitional stages leading to the formation of monocytes and clasmatocytes. The cytoplasm, though increased in amount, was still rather inconspicuous. Nuclei had become kidney-shaped and were sometimes surrounded by small vacuoles. Mitotic figures occurred more often than in the earlier months. An interesting phenomenon was observed in the larger lymph vessels. Cells of adenoid or lymphoid character which in non-pregnant uteri are seen in close proximity to parametrial lymphatics, undergo proliferation and ultimately form miniature lymph glands beneath the endothelium and project into the lumen.

Dr. Hofbauer points out that similar formations are noted in the development of lymphatic glands in embryonic life and regards it as quite probable that this lymphoid tissue may play the same biological rôle as the ordinary lymphatic glands.

Another group included uteri removed by operation after Cæsarean section performed at an appointed time before the onset of labour. An excess of macrophages was present and monocytes were prevalent. There were also evident cells of another type. These lay in the immediate neighbourhood of the small blood vessels and they also occupied the interstices between the muscle bundles of the outer layer of the cervix. This type of cell is regarded by Dr. Hofbauer as the "stem" cell of the macrophages. In specimens removed after the onset of labour in the absence of an infection transitional stages of the development of this ancestral cell could be seen from the original cell to monocytes and clasmatocytes. In these specimens also macrophages were very abundant. Monocytes and clasmatocytes were present in about the same proportion. Mitotic figures were numerous. Dr. Hofbauer emphasizes the fact that the phagocytic cells were more numerous in the base of the broad ligament than in the loose connective tissue constituting its upper part. In the parametrial tissue of uteri removed on account of prolonged labour in the presence of an early infection the microscopical picture was similar to that already described except that the cells were much more numerous.

From these observations Dr. Hofbauer concludes that during pregnancy a phagocytic tissue consisting of monocytes and clasmatocytes makes its appearance in the base of the broad ligament and that this is intensified during labour, but particularly by the occurrence of an infection. He regards the presence of this phagocyctic tissue as a prophylactic biological reaction and as a protection against infection. There is an increasing impression that even the temporary limitation of an infection resulting from the invasion of bacteria may determine the eventual outcome and also that local reaction at the port of entry tends to prevent general involvement. Dr. Hofbauer expressed the hope that his findings may fill in a gap in knowledge of the subject, but does not wish to minimize the part played by immune bodies in the blood in increasing the resistance of the individual to infection.

It has been shown that phagocytosis is dependent in part at least on chemiotaxis. It is easy to understand an aggregation of leucocytes in the uterine tissue in the presence of a bacterial infection —the bacteria would in these circumstances supply the chemiotactic stimulus. From Dr. Hofbauer's work it appears that chemiotaxis gradually takes place from the earliest stages of pregnancy. It is not so easy to determine how this is occasioned. Dr. Hofbauer makes brief reference to three possible causes and tentatively at any rate accepts one by a process of exclusion. Irritation by foreign protein substances is known to cause a response of mesenchymal tissue elements and of undifferentiated cells in the vicinity of blood vessels, but Dr. Hofbauer holds that there is nothing to lead to the belief that the specific stimulant in the parametrium is the result of breaking down of chorion tissue. Moreover, it is unlikely that proliferation and breaking off of chorion tissue can be the main factor. This is most pronounced in the early stages of pregnancy and the parametrial changes are most prominent at the end of pregnancy. Dr. Hofbauer then is driven to the most "conceivable" view that the hormone or similar substance which produces the well-known changes in the organs of the pregnant woman, causes the parametrial phenomena. The determination of the substance giving rise to the chemiotactic stimulus thus remains to be determined.

A PRIZE ESSAY FOR STUDENTS.

The Council of the British Medical Association has announced that a prize of ten pounds will be given to the author of the best essay on the three types of thyreoid enlargement and their treatment. The competition is open to medical students of any university in the British Empire outside the United Kingdom in their final year. The essays may not exceed five thousand words and must include concise notes of the illness of not more than three patients personally attended by the students. The essays should be plainly written or typed on foolscap paper. They must be in the hands of the Medical Secretary, British Medical Association House, Tavistock Square, London, W.C. 1, not later than January 15, 1927. Each essay is to be subscribed with a pseudonym and is to be accompanied by a sealed envelope marked on the outside with the pseudonym and containing a signed and dated statement that the essay is the *bona fide* work of the competitor and that he or she has not yet passed the final professional examination, together with his or her full name, address and medical school.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Tuberculosis: A Retrospect.

A. ADAMS (*Tubercle*, February, 1926) has summarized the methods, old and new, for treating tuberculosis. One method alone, he says, has accomplished very much—sanatorium treatment. Most other plans for treatment are founded on unreliable data and half-baked conclusions. There is probably no known drug which has not been tried at some time or other. Coal tar and the creosote group were long popular; guaiacol and creosote were once thought to be almost specific. It is certain (Dixon) that guaiacol is in part excreted by the lung, but most of the benefits produced by drugs of this class may be credited to intestinal antisepsis. Calcium salts, once swallowed by or injected into the patient, have now fallen into disuse. For many years cod liver oil has been a sheet anchor in treatment. Williams thought it beneficial in virtue of its content of fatty acids, most abundant in the light brown oil. Today the value of the oil is thought to reside in its vitamins and in these the light brown oil is poorest. Petroleum emulsion, once largely used, is nothing more than a mechanical lubricant. The hypophosphites are excreted unchanged by the kidney and cannot be substituted for phosphorus. The essential oils have enjoyed an unmerited reputation resting entirely on faith. Since the discovery of "Salvarsan" a search has been made for a salt of the heavy metals or for some drug which, given intravenously or intramuscularly, would affect the tuberculous lesion as "Salvarsan" does the syphilitic. Cantharidine, emetine and the esters of cod liver oil have been so used. Of the heavy metals succinamide of mercury was later replaced by "Salvarsan" and more recently by the "gold cures" ("Sanocrysin" and "Krysolgan"). In 1890 Koch introduced tuberculin and by the use of large dosages attempted to create an active immunity. These attempts have persisted ever since to the accompaniment of embittered warfare between leading specialists over the question of suitable dosage. The discovery of the opsonic index led to a species of homœopathy, but there is as yet no standard by which the potency or virulence of tuberculin may be fixed. A flock of remedies followed Koch's discovery (exo- and endotoxins, bacillary emulsion, Marmorek's serum *et cetera*), but all tuberculins and antiserum are now discredited as curative agents and the leading sanatoria of England have long since discarded them. Spahlinger's system of treatment aims at the production of an active and passive immunity. He employs a vaccine producing active immunity against the tubercle bacillus, combined with an antitoxic and bacteriolytic serum conferring a passive immunity, the latter also fortified by the serum of a horse which has been injected firstly with dead and later with living organisms found in secondary infections. Spahlinger aims at the gradual destruction of the tuberculous and the mixed infection. He hopes by the slow neutralization of the dominating process to give assistance to the natural defences of the body. But the passive immunity is of very short duration and to attain it, the treatment must be uninterrupted. Although improvement may be brought about by the use of the serum, relapse or reinfection is always likely, because the passive immunization has not modified the natural resistance of the patient to tuberculosis. Amongst physical remedies ultraviolet rays have given disappointing results. Patients tire of the treatment unless perceptible benefits are quickly apparent and cases are not uncommon in which the reactivation of the disease may be directly attributed to the light treatment. The operation of pneumothorax was performed as long ago as the year 1820, when adhesions then as now were often obstacles in the way of success. Adams is of the opinion that the results of the operation are palliative only and that the results do not justify the operation. The same criticism applies to the operations of thoracoplasty and section of the phrenic nerve. That the words "selected cases" should be used as a qualification in any form of treatment is sufficient to condemn it. Good and proper treatment is equally applicable to all cases of a given disease. There are no such limitations applied to the use of quinine, "Insulin," "Salvarsan," the salicylates *et cetera*. The lowered mortality rate in tuberculosis today is due to a combination of factors, such as early diagnosis, notification, segregation and improvements in general hygiene and to no single form of treatment.

Antimony Tartrate.

J. B. CHRISTOPHERSON AND S. R. GLOYNE (*The Lancet*, January 30, 1926) report investigations into the biochemical action of intravenous antimony tartrate injections. If 0·06 gramme (one grain) in two cubic centimetres of water is injected, dry cough, pain in the chest and constriction in the throat occur owing to its action on bronchial and laryngeal mucosa; nausea, colic and diarrhœa indicate its presence in the intestinal mucous membrane; a desire to micturate shows a similar location in the bladder and giddiness or headache are evidence of its effect on the cerebrum. A biochemical reaction is shown in the shock sometimes produced and this symptom recurs at each injection. Indeed the patient becomes sensitive to smaller doses, due apparently to drug allergy. A number of patients with psoriasis were treated with injections as above with considerable benefit, probably owing to its effect in improving the general condition of the patients. Antimony affects the liver, causing increased cellular activity, cellular degeneration or cell destruction according to the size of the dose. *Post mortem* examinations were made histologically of the liver of a man who died as a result of accidental intravenous injection of 0·78 gramme (thirteen grains) of antimony tartrate; considerable destruction of liver and kidney cells was found. Injections into rabbits of 0·015 to 0·03 gramme (one-quarter to one-half grain) repeated until 0·06 to 0·24 gramme (one to four grains) had been given, caused death; similar changes were found in liver and kidneys. Injections of sodium thiosulphate, 0·6 to 1·2 grammes, given after injections of antimony tartrate delayed death in another rabbit. It was thought that the signs of hypersensitivity might be due to an alteration of protein metabolism and in extreme cases might resemble true protein shock.

Control of Blood Pressure.

W. J. MACDONALD AND T. C. BURNETT (*Boston Medical and Surgical Journal*, March 4, 1926) discuss the effect of organ extracts on blood pressure. It had been shown that extracts of crayfish muscle, leeches, mussels, liver, thyreoid, spleen and nervous tissue cause temporary lowering of blood pressure, as also does peptone and egg albumin. Dogs were anæsthetized with barbitone, 0·25 gramme per kilogram, given intraperitoneally. This drug caused a fall of blood pressure averaging thirty-six millimetres in six hours. The injection of two cubic centimetres of liver extract intravenously caused an immediate fall of blood pressure, with recovery in one or two minutes; intramuscular administration produced a slower fall and recovery was delayed for some hours. Histamine and cholin were present in the extracts used and it was found that each of these substances produced a similar fall in blood pressure when injected as above. The injection of histamine and cholin together into human subjects with high blood pressure (without cardiac or renal disease) did not cause a fall in blood pressure, whereas injection of liver extract did do so. Histamine alone injected into the muscles of patients with high blood pressure reduced the blood pressure for an hour at most, whereas liver extract reduced it for several hours. It appears therefore that the fall in blood pressure was not wholly due to the histamine present in the liver extract. It is not known what other substances present in the extract may act in this direction. The investigations are being continued.

Treatment of Tetanus.

W. JADASSOHN AND G. STREIT (*Klinishche Wochenschrift*, July 30, 1925) are satisfied with their results in the treatment of tetanus with injections

of grape sugar and magnesium sulphate. They usually administered intravenously seven to seventeen cubic centimetres of a 20% solution of grape sugar with three cubic centimetres of 25% magnesium sulphate solution. This was given three or four times daily and the doses gradually reduced. It has also been successfully used by intramuscular injection.

UROLOGY.

The Incidence of Ureteric Stricture.

N. B. RATHBUN (*Journal of Urology*, October, 1925) discusses the true incidence of stricture of the ureter. For the diagnosis to be correct, the stricture must show up clearly in a ureterogram and there must be a definite dilatation of the ureter above it. The pyelogram should be made with the point of the catheter a little below the entrance to the renal pelvis. While the ureterogram exposure is being made, the catheter should be withdrawn into the bladder, the surgeon meanwhile injecting the opaque fluid. By this means a stricture at the very lower end of the ureter will not be missed. During 1924 the author and his assistants made seven hundred and thirty-nine complete urological examinations, the routine method including the taking of a pyelogram and a ureterogram on one side and sometimes on both; in the latter case the second ureterogram was always made at a second sitting. In a large proportion of the seven hundred and thirty-nine patients no urinary tract lesion was found, especially among patients referred from general surgeons and gynæcologists for diagnosis of obscure abdominal conditions. Out of the total number of the patients a diagnosis of ureteric stricture was made in ninety-two. Seven were tuberculous strictures, seventeen were complicated by or were part of a urinary lithiasis and four were associated with renal or vesical tumours. Excluding these there remained sixty-three patients in whom a diagnosis of primary ureteric stricture was made. Practically without exception all sixty-three patients were cured or improved by a form of treatment based on the diagnosis of ureteric stricture.

The End Results of Operation for Hypernephroma.

G. G. SMITH AND A. R. SHOEMAKER (*Journal of Urology*, October, 1925) have made a careful study of all patients whose condition was diagnosed as hypernephroma and who were treated at the Massachusetts General Hospital between 1900 and 1923. Of one hundred and forty case histories investigated all but sixty-two were rejected because of insufficient grounds for the diagnosis. Of the sixty-two patients only twenty-seven were considered suitable for operation and in these the tumour was removed by nephrectomy. The end results show that the operation could be called worth while in only nine instances. Six more patients were discharged relieved, but were lost sight of afterwards. Early diagnosis is important in securing a good remote result from operation and in this regard the addition of pyelography to the diagnostic measures has proved to be of the utmost value. If possible a diagnosis should be made before there is a palpable renal enlargement. Unfortunately many tumours become well advanced without causing either hæmaturia or pain. Only about 45% of the patients had hæmaturia and about 55% renal pain. The most constant finding was that of palpable renal pain.

The Treatment of Small Hydronephroses.

O. MERCIER (*Journal d'Urologie Médicale et Chirurgicale*, December, 1925) discusses the pathogenesis and the treatment of small hydronephroses which are often stated to be without apparent cause. Pyelography has enabled the surgeon to diagnose this condition. It is responsible for greater pain than is caused by large hydronephroses, as the muscular contractility of the pelvic wall is still comparatively unimpaired. At operation the cause will be found in the presence of bands or adhesions which are attached to the upper part of the ureter, fixing it in one position, so that when for any reason a slight lowering of the kidney occurs, the renal pelvis assumes a more horizontal position than is normal. Urine tends to collect in the lowermost part of the renal pelvis and the muscle of the pelvic wall successfully expelling this residue at first, but failing later on. In this way the pelvis becomes slightly dilated and a vicious circle is set up. The pyelogram will reveal slight dilatation of the pelvis which lies in a more horizontal plane; at a further stage the pelvis may be seen to lie obliquely from above downwards and outwards. The best treatment is to remove the periureteric adhesions or bands and then to perform a high nephropexy.

Micturition in Two Stages.

O. MERCIER (*Journal d'Urologie Médicale et Chirurgicale*, August, 1925) holds that the phenomenon of micturition in two stages is not solely characteristic of vesical diverticulum; it is also observed in the presence of hypertrophied interureteric bar. As soon as the act of micturition begins, the bar by reason of muscular contraction becomes more prominent on the bladder floor and forms the anterior wall of a deep depression. The depression forms behind the bar and the urine cannot escape from it. When the muscular action ceases, this retained urine flows towards the bladder neck and there arises a second call to urination when the residue is evacuated. In order that the phenomenon be produced in this way, the bar must be well developed and the vesical contractility good.

Primary Tumours of the Ureter.

R. L. STEWART (*The British Journal of Surgery*, April, 1926) holds that primary tumours of the ureter are rare. They are chiefly seen in patients in the sixth decade of life. They are usually papillary in structure and many are benign papillomata, but there is a decided tendency towards malignant disease in the form of papillary or medullary carcinoma and squamous epithelioma. The more usual symptoms are not pathognomonic and resemble those arising from renal neoplasms, namely, hæmaturia, pain and sometimes renal enlargement due to ureteric obstruction. Accurate diagnosis is very difficult, but ureteropyelography is sometimes of assistance. In about 40% of the recorded cases the tumour was not discovered until the autopsy was made. Radical operation in the form of complete removal of the kidney and the whole of the ureter is the most suitable treatment.

Blood Analysis in Prostatic Obstruction.

I. COHEN, E. C. DODDS AND C. H. S. WEBB (*The British Journal of Surgery*, April, 1926) publish the results of three years' study of the chemical constituents of the blood in prostatic obstruction. Tests of renal excretion are sometimes misleading and often insufficient to determine operative prognosis, while information gleaned from a study of the blood is of the greatest value. Workers differ in regard to the relative values of the various chemical constituents of the blood as prognostic indices, so the authors made their study include a comprehensive range. The substances examined were urea, non-protein nitrogen, creatinine, uric acid, amino acid nitrogen, sugar and chlorides. It was noted that the values of the various constituents did not commonly rise or fall together. Thus the blood urea and the non-protein nitrogen contents may be low, whilst the creatinine is high or *vice versa*. The sugar content varies quite independently of the renal, whilst the chlorides and amino-acid-nitrogen bear little or no relation to the clinical condition. A careful inspection of all the figures reveals that the non-protein nitrogen and uric acid values are the most constantly raised in renal disturbance. After careful study of results of operation in fifty-four patients it was found that the upper limit of safety for a one-stage prostatectomy was fifty milligrammes of non-protein nitrogen per one hundred cubic centimetres and 3·5 milligrammes of uric acid per one hundred cubic centimetres. If the figures are above these, a preliminary cystostomy is advisable. The blood urea content, so commonly employed, is a much less reliable index. A high blood urea content is always of grave import, but unfortunately a low content does not always indicate a normal renal function. Laboratory findings should always be considered in relation to the clinical state of the patient.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Lister Hall, Hindmarsh Square, Adelaide, on June 24, 1926. DR. H. H. E. RUSSELL, the President, in the Chair.

Skiagrams.

DR. H. A. McCOY showed a series of slides demonstrating the direct evidence of ulceration of the stomach.

Ovarian Pregnancy and Endometrioma.

DR. BERNARD DAWSON read a paper entitled: "Ovarian Pregnancy and Endometrioma: A Preliminary Note" (see page 233).

DR. W. A. VERCO thanked Dr. Dawson for bringing this interesting subject before the meeting and for the admirable way in which he had presented it. Some sixteen years previously he had removed an ovary with a pregnancy inside of it. The gestation sac had been prominent and the embryo hanging in the cavity by its delicate umbilical cord. As far as he could recollect the luteal body was arranged in a crescentic formation around the gestation sac. Professor Cleland had made sections from the specimen, but he could not be certain of the exact nature of his findings. Evidently the specimen was rather ancient for exact microscopical determination.

The presence of endometrial grafts in the pelvic peritoneal cavity opened up a large and varied field of interest. The exposition of Sampson, of New York, had put quite a difficult aspect on many pelvic cavity findings. It was doubtful if all of these "seedings" came from the interior of the uterine cavity. Some of them were probably Fallopian in their origin. Owing to the smallness of the lumen of the tube in its intramural portion and to the natural current of the contents of the tube being from within outwards it was probably only when some obstruction existed at the cervix, that blood and endometrial cells from the uterine cavity passed into the tube and thence to the pelvic peritoneum and its contained organs. It was very seldom that he had seen menstrual blood in the tubes when operating.

As to the frequency of the occurrence of endometrioma some American observers said it occurred in 10% of pelvic abdominal operations. In his experience both in private practice and at the Adelaide Hospital it was comparatively infrequent.

DR. T. G. WILSON said he would like to congratulate Dr. Dawson on his excellent contribution and his careful summary of the literature of a very interesting subject. He said that his interest in the subject of ovarian pregnancy dated from the occasion about 1901 when he had had the good fortune to be present at a meeting of the London Obstetrical Society at which Dr. Bland Sutton (now Sir John Bland Sutton) demonstrated sections from the specimen of Mademoiselle Van Tussenbroek, of Amsterdam, which as Dr. Dawson had pointed out was the first case of ovarian pregnancy accepted in England as having been definitely proven.

The occurrence of tumours containing endometrial elements in various parts of the pelvis and abdomen had been known for many years, especially those tumours known as adenomyomata and none of the older theories as to their ætiology—von Recklinghausen's of embryonic remnants, Kossman's of accessory Müllerian ducts or the inflammatory and inclusion theories of Meyer and Cullen—seemed to account for their varying location as well as Sampson's theory of peritoneal implantation.

That the ovaries should be the favourite sites for these implants or endometrioma might be accounted for by endometrial elements finding a more suitable habitat in the cavity left by a recently ruptured *corpus luteum*, but it seemed evident that even this was not necessary as was proven by Dr. Eden's case cited by Dr. Dawson and many other observations.

The occurrence of these endometrial grafts in the pelvis seemed to offer a very fascinating theory for the occurrence of pregnancy occurring outside the uterus and tubes and it would seem that it also allowed a possible explanation of that much disputed condition, namely primary abdominal pregnancy.

If the fertilized ovum must engraft itself on endometrial tissue, was it not feasible that it might engraft itself on any of these endometrial implants whatever their situation? This was going a step further than Dr. Dawson had suggested. In these cases of pregnancy outside of the uterus and tubes it became exceedingly difficult, owing to the disorganized condition of the tissues present at the time of operation, to prove the site of the original implantation of the zygote.

Dr. Wilson said that he was inclined to think that ovarian pregnancy was possibly more frequent than a perusal of the literature would seem to indicate. In the cases of so-called tubo-ovarian pregnancy it was exceedingly difficult to say even after careful microscopical examination whether the original implantation of the zygote had been in the tube with a secondary implantation either in a recently ruptured graafian follicle or on the surface of the ovary or whether the original implantation had been primarily in either of these latter situations. It was known that in a normal uterine pregnancy there might be decidual reaction in the cells of the Fallopian tube. It was on account of these difficulties in diagnosis that Spiegelberg's original four criteria of ovarian pregnancy have been added to, so that Number 1 criterion was made to read "that the tube on the affected side must show no signs of pregnancy" and Number 4 criterion to read "that ovarian tissue must be found in the walls of the sac in several places."

Certainly the condition of tubo-ovarian pregnancy was by no means an uncommon one.

Dr. Wilson said that in his experience endometriomata in the pelvis were frequent tumours, though he was inclined to agree with Dr. Verco that the frequency in Adelaide had not been as great as that recorded by some American writers. The occurrence of chocolate cysts of the ovaries had been very puzzling before their mode of origin was definitely proven, as they had not seemed to correspond with any definite class of ovarian cysts. That their mode of origin was in doubt for so long was probably because at the time they came to operation it was difficult actually to demonstrate endometrial elements in the walls of the chocolate cyst.

Dr. Bull at the Government Laboratory had told him that in his experience it was extremely difficult actually to demonstrate these cells in the specimens sent to the laboratory for examination.

Sampson has pointed out that not only endometrial implants might occur in the pelvis from regurgitation through the tubes, but also malignant implants in cases of carcinoma of the body of the uterus and that these implants might be forced through the tubes either in the preliminary diagnostic curettage or as the result of manipulations of the uterus in bimanual examination. He even advised against the introduction of radium in these cases, as the tube containing the radium might act as a piston and actually force small fragments of growth into the peritoneal cavity through the tubes.

It seemed to depend on the patency of the interstitial portion of the tube. The same reasoning might apply to the dilatation of the tubes for the diagnosis of the cause of sterility after the method of Lubin or Bonney, as these procedures were generally preceded by a curettage and if the tube should be patent, portions of endometrium might be forced through the tube. Altogether the whole subject offered a wonderful field for investigation and Dr. Wilson said he was glad to note that Dr. Dawson had labelled his very interesting paper a "Preliminary Note," as it gave promise of hearing more at a later date.

DR. A. A. LENDON said that he was greatly impressed by Dr. Dawson's lucid presentation of his case. The theory which he had advanced, was adequate to explain not only ovarian gestation and tubal pregnancy, but also a case such as Gröne's (*The British Medical Journal*, April 3, 1909, page 865), in which a primary peritoneal preg-

nancy seemed to have occurred. There was no difficulty in assuming that tiny fragments of endometrium might travel along the tubes into the peritoneal cavity since C. J. Bond, of Leicester, had demonstrated the existence of reverse currents in the Fallopian tubes.

DR. C. DUGUID congratulated Dr. Dawson on his paper and his generous references to Drs. Lyle Sutton and Webster. The latter had appealed to him as the prophet crying in the wilderness. He had laid down two dicta as mentioned by Dr. Dawson, namely (i.) that a fertilized ovum could only begin development in tissue derived from the Müllerian tract and (ii.) that decidual transformation was peculiar to Müllerian tissue. In cases of uteric pregnancy Webster had found areas of decidual cells in the cortex of the ovary close to the surface. He definitely claimed them as similar to uterine decidua and regarded them as quite distinct from the surrounding stroma. "It is not unlikely that these areas represent detached portions of Müllerian tissue which have become attached to the surface of the ovary" was surely a remarkable statement made over twenty years previously. Webster had not been shaken when decidual cells were found in other situations believing that the same explanation could hold there too. But he suggested an alternative. The areas in the ovary might be derivatives of the surface epithelium and he quoted Marchant who pointed out that embryologically the lining of the tube and the epithelial surface of the ovary were identical. This was interesting as in Herd's thesis, 1925, he claims to have observed four distinct ways in which endometrial tissue reached the ovary and these included the two suggestions of Webster.

Bailey opposed the ovaries as intermediate hosts for endometriomata. He regarded all tumour formations as arising from simultaneous deposition of epithelium. There was no bursting, he held, of chocolate cysts with reimplantation of epithelial elements. As these cysts always burst on removal without regrowth as far as was known, this view would seem to be correct. The chocolate material was the result of repeated menstruation on the part of the endometrial cells disorganized in the depleted host. Bailey had injected this material into the pelvic peritoneal cavity of rabbits without result and he had failed to produce any growth in cultures.

Finally he asked what was the factor which determined whether the exfoliated epithelium should live or die? Millions of flakes must pass over the perineum but only three cases of endometriomata were known and probably very many more intraperitoneal flakes died than lived.

He wished Dr. Dawson the highest success in the future of his research.

DR. R. F. MATTERS said that Dr. Dawson's paper appeared to be a tribute to his careful investigations and thoughtful conclusions.

The theory of Sampson on endometriomata which Dr. Dawson stressed, was supported by the work of Katz who carried out successful experimental implantation of endometrial tissue on the ovary. Blair Bell, however, considered that these endometriomata arose from Müllerian inclusions during development when the Müllerian tissue extended out from the dorsal wall of the cœlom to become uterine and part was included in the ovarian stroma to become active later after the onset of menstruation.

When in United States of America Dr. Matters had seen an endometrioma of the posterior vaginal wall occurring in an old laceration due to forceps delivery. Evidently the endometrial tissue had become implanted when the laceration occurred and had survived. A definite blood cyst had been present with a "cytogenous mantle" well developed.

That spermatozoa reached the abdominal cavity at times was shown in a case of Lockyer's (he thought), in which a tube, attached to a fibrous uterine horn, was the site of an ectopic gestation, the *corpus luteum* appearing in the opposite ovary.

He did not agree with Dr. Dawson that endometrial tissue was essential for the production of ovarian pregnancy. Was it not possible that the trophoblast produced its own decidual reaction by metaplasia of the ovarian tissue? If not whence arose the endometrial tissue in the tubes where gestation was relatively common? Young positively asserted that decidual reaction occurred in the tubes during tubal gestation.

Possibly the rare occasions of ovarian pregnancy were those when the *discus proligerous* with its ovum was not ejected at the dehiscence of the follicle, meanwhile the expectant spermatozoan propelled itself along under the positive chemotaxis of the ovum and fertilized this bashful cell in the follicle. Or might not the ovum be fertilized in the peritoneal cavity near the follicle and, finding a resting place nigh at hand, embed itself in the follicle?

He asked also why, if the theory presented that night were true, there was so much luteal tissue in the walls of the sac. He was struck by the fact that the cases mentioned had the sac and *corpus luteum* not only in the same ovary, but absolutely approximated. Further if the sac had formerly been the site of an endometrial cyst, why was there such an absence of adhesions which otherwise were so typical?

Dr. Dawson had given a paper which he hoped would be productive of further investigations and he heartily congratulated him.

Dr. Dawson, in reply to Dr. W. A. Verco's remarks, apologized for not mentioning Dr. Verco's specimen more fully, but at the time of the preparation of the paper it had not been examined microscopically.

Dr. Dawson stated that he did not follow Dr. Verco's objection to the implantation theory of endometrioma on the grounds that menstrual blood would find difficulty in traversing the Fallopian tubes against stream. The direction of flow in the tubes probably varied during the menstrual cycle and it was well known that spermatozoa and inorganic substances, such as barium sulphate and "Lipiodol," easily passed from uterus to pelvic cavity.

Replying to Dr. T. G. Wilson, Dr. Dawson said he had not mentioned primary abdominal pregnancy, as he considered its occurrence not proven. It was not easy to distinguish between a primary and secondary abdominal pregnancy.

Dr. Dawson pointed out that there were specimens in museums labelled ovarian pregnancy that were tubo-ovarian pregnancies secondary to tubal abortion.

In reply to Dr. Duguid, Dr. Dawson said that he in no wise wished to detract from the value of the work of Webster, but gave to Lyle Sutton the credit of first associating ectopic endometrium and ovarian pregnancy, because he was the first to use in this connexion the word endometrioma.

The question of the survival of endometrial fragments in the peritoneal cavity had not been explained, but it was probable that many regurgitated fragments perished and were absorbed witht their accompanying blood. The occurrence of an endometrioma of the perineum could be explained only by implantation upon or within a breach of the skin.

Replying to Dr. Matters, Dr. Dawson pointed out that there were many, probably a majority of cases of ovarian pregnancy, in which no lutean tissue could be demonstrated in the wall of the gestation cavity. Lyle Sutton mentioned nine such cases. Endometrioma of the vagina raised the question of lymphatic spread of these neoplasms. Sampson held that they could be disseminated by lymph channels in the same way as malignant cells. This was Sampson's explanation of the occurrence of endometriomata in such sites as the round ligaments and rectovaginal septum.

Modern Developments in Obstetrics.

DR. R. F. MATTERS read a paper at a meeting of the Branch on September 24, 1925, entitled "Modern Developments in Obstetrics" (see THE MEDICAL JOURNAL OF AUSTRALIA, December 12, 1925, page 672). Discussion on this paper had been postponed until after its publication.

DR. C. DUGUID was convinced it was still very necessary to preach the practice of antenatal treatment. Pelvic estimations of *primiparæ* in the three weeks before labour was essential, but it was not always done.

In packing for *placenta prævia* he had found an anæsthetic necessary, as the packing had to be done tightly. Morphine lessened the discomfort, calmed the patient and tended to soften the *os*.

There was much in the paper worthy of mention, but as the hour was late he would confine his remarks to what appeared to him to be an omission. Dr. Matters could not include everything, but he was sorry he had not mentioned the work of Watson and of Bonney on the pubo-cervical fascia, overstretching or tearing of which at its anterior end led to dribbling of urine. Of women who had borne children 70% suffered a leakage of urine on sneezing, coughing or on some particular movement. In a woman in labour with a resistant perineum the head was driven forward with strain against the anterior vaginal wall. This wall was attached to the fascia or muscle sheet which came down from back of pubic bone to the cervix and the bladder lay above it. Too much attention was given to the perineum *per se* and if the head was held back below and pushed forward above before the occiput had cleared the pubic arch, the anterior vaginal wall was overstretched, causing what might prove to be a permanent relaxation of the pubo-cervical fascia. Episiotomy was the treatment in such a case. Watson considered that stretching of the anterior lip of the cervix over the descending head brought about the same result.

Too little attention had been given in the past to the anterior segment of pelvic floor.

He had greatly enjoyed the paper.

DR. T. G. WILSON said that owing to his absence from the State he had not had the opportunity of hearing Dr. Matters read his paper in September, but had since read it in the Journal and he would like to take the opportunity of congratulating Dr. Matters on his comprehensive survey of this important branch of medical education. He was glad to hear that Dr. Matters had everywhere been impressed with the fact that the various teaching bodies in the schools that he visited, were at last waking up to the fact that the facilities for the teaching of practical obstetrics had lagged shamefully behind those afforded for the teaching of practical medicine and surgery and he hoped that in the near future their own school of medicine would fall into line with the more recent ideas in that respect.

It was high time that students should devote more than one month to the acquisition of their knowledge of practical obstetrics. Seeing the importance of a knowledge of obstetrics to the recent graduate he felt strongly that at least three months of his six years' course of study should be spent in an entirely obstetric atmosphere, the time being split up between antenatal work, actual labour and postnatal clinical study. He had advocated these views on many occasions during the previous twelve years as well as the advisability of teaching obstetrics with gynæcology, because he thought that the teaching of these two subjects should go hand in hand. He was quite aware of the difficulties of providing sufficient clinical material, but it was a matter that had to be faced and to his mind was not unsurmountable, if seriously tackled.

In reference to the method of Lubin for testing the patency of the Fallopian tubes, while in London recently he had heard an address given by Dr. Lubin, of New York, before the Obstetrical Section of the Royal Society of Medicine and he had seen a demonstration of his most ingenious appliance. It struck him as a little cumbersome and taken altogether as not presenting any great advantage over the instrument of Bonney which he had found satisfactory and which did not necessitate X ray photographs nor the use of oxygen. Dr. Wilson said he was interested to hear that Dr. Lubin claimed that this method of inflation had at times actually cured patients with sterility and it seemed quite a reasonable procedure to adopt after the operation of salpingostomy, in order to prevent if possible the closure of the artificial ostium. He said that his personal experience of the operation of salpingostomy had not been very satisfactory, as he had on several occasions had to reopen the abdomen when he had done this operation and always found the tube again occluded. He could recall only two cases of pregnancy following this operation, one was a normal pregnancy, the other patient had a tubal gestation.

In reference to plevic measurements he quite agreed that in the ordinary case the size of the passenger was of equal importance with the size of the pelvis. He had for many years used Bradys's portable pelvimeter in preference to the more usual instrument of Skutch which was much more difficult to use, and he found that the Bradys instrument which he demonstrated, was quite satisfactory. The subject of toxæmia of pregnancy and eclampsia was always of interest and he was glad to see that Dr. Matters had noticed that operative procedures such as *accouchement forcé* and Cæsarean section for the condition of eclampsia had fallen into disuse. It seemed that a few years previously these procedures had quite an unjustifiable furore and as the report of the Select Committee of the Obstetrical Section of the Royal Society of Medicine had been published about 1922, it was to be hoped that such procedures would be discontinued. Their investigations definitely proved that the mortality of such procedures even in the hands of experts was much greater than that following less drastic procedures.

Dr. Wilson thought the eliminative method as advocated by the Dublin School was the most suitable procedure, but still felt that in some cases morphine might have to be used to control fits till the eliminative method could be started, as this method was essentially a hospital treatment. So that for practical purposes he thought that a combination of this method with Strogonoff's measures must be considered.

There was no question to his mind that antenatal care and regular examination of the urine should practically make eclampsia a preventible disease.

For *antepartum* hæmorrhage in the absence of labour pains he still considered that plugging of the vagina was the most suitable operation, but the plugging should be done efficiently. He had seen patients sent into hospital with the vagina plugged and the plugging had not been efficiently done. For a central *placenta prævia* in a non-suspect case he would not be averse to Cæsarean section, if the patient were in suitable surroundings.

The induction of labour by castor oil and quinine was quite satisfactory when it came off, but he had found cases in which pains could not be started by this method. For some years he had been accustomed to use a sterilized stomach tube as advised by the Dublin school. It was quite efficient and by a twisting motion could easily be introduced into the uterus outside the membranes and the fact that it could be boiled was to his mind a great advantage. Apart from some of the French gum elastic bougies which could be lightly boiled, he had never felt quite happy about using bougies that could be sterilized only by soaking in an antiseptic solution.

Dr. Wilson was interested in the description of the routine technique as used by Dr. Potter, of Buffalo. There was an average of one thousand one hundred patients a year, all of whom were treated either by version or Cæsarean section and Dr. Matters had not told them the proportion of Cæsarean section cases. He could not but be impressed with the efficiency of the aseptic technique and realized that in any specialty there were always extremists. Dr. Potter he should say was an "extreme extremist." There was only one procedure that he wished to discuss and that was the method of "ironing out the levatores by a stroking motion" in the process of stretching the perineum preparatory to delivery.

When it was remembered that a perineum might be overstretched and relaxed even when there had been no external tear, it seemed that this forcible stretching of the perineum would in some cases have the effect of causing a separation of the longitudinal fibres of the *levatores ani* and he was inclined to agree with the judgement passed on this method of treatment by Dr. de Lee. If this divarication of the fibres of the *levatores ani* could happen in a normal labour simply on account of the extra size of the head, it seemed that manual stretching which would be done much less gradually than in labour, must have the same effect.

The use of Davis and Gwathmey's method of rectal anæsthesia in labour had never appealed to him much. It was a messy and cumbersome method and had definite disadvantages. Dr. Wilson said that he thought that mor-

phine and scopolamine gave good results in the large majority of cases and he had not seen any serious trouble from asphyxia in the children, if the precaution were taken of not giving injections later than the first stage of labour. He had been, he thought, the first to advocate this method in South Australia, when he read a paper on obstetric work before the Branch in 1908. In this same paper he had advocated another procedure which Dr. Matters mentioned in his paper, namely allowing patients to get out of bed and sit up from the third or fourth day *post partum*. In the absence of complications such as perineal stitches *et cetera* he felt sure this procedure had many advantages, not the least of which was favouring lochial drainage. Although the patient was allowed to sit out of bed earlier than usual, she was not allowed to resume her ordinary duties any earlier than under the older routine. This question of favouring lochial drainage was one that he had always felt could not be too much stressed in the teaching of students, as so many of the minor rises in temperature that occurred in the puerperium, were due to inefficient lochial drainage. An appreciation of this fact would render unnecessary washing out of the uterus *et cetera* which he was inclined to think was too often advocated in some cases.

Dr. Matters thanked those present for the way in which his paper had been received, but regretted that such a long interval had elapsed between the giving of the paper and the discussion of it. The discussion of such a paper Dr. Matters considered to be a very important feature and the value was largely lost owing to the fact that many men had lost their notes of the paper or had forgotten the statements.

Dr. Matters said that Dr. Wilson had remarked on the treatment of toxæmia from the nonoperative point of view. Fitzgibbon, of the Rotunda Hospital, regarded the patient as though she were purely suffering from a toxic condition and as if no fœtus existed *in utero*. Dr. Wilson had stated that he preferred to treat *antepartum* hæmorrhage with vaginal packs, but Dr. Matters thought that this treatment was ideal only in marginal cases of *placenta prævia*, but he preferred to follow the rule of Cæsarean section in all central cases.

The references to Potter, Dr. Matters said, were regarding his technique which he considered excellent in the art of version, but he did not regard it as an example to follow in all cases. He agreed that Potter's "ironing out" of the perineum often separated the levators producing either rectocœle or even prolapse. He was glad of Dr. Wilson's support of the lochial drainage, as he considered it probably the most important feature in the puerperium.

Regarding Dr. Duguid's remarks on incontinence Dr. Matters considered that this could be best avoided by insuring that the bladder was empty and that the occiput was not pushed forward too soon. It was wise to wait until the occiput had passed the *symphysis pubis*, otherwise stretching of the pubo-cervical ligament would occur with relaxation of the urethral sphincter. He agreed that it was difficult to pack the vagina effectively without an anæsthetic.

In regard to rectal synergia Dr. Matters confessed that the results appeared inconsiderable for all the trouble, mess and expense. He also referred to the danger of giving a general anæsthetic in those cases in which rectal treatment had failed.

Referring to cervical dilatation and packing as a means of induction, Dr. Matters considered that this method was usually successful, but that if the cervix were dilated, the introduction of the rubber tube was more aseptic as a procedure and that it was possibly easier. The action was certainly more reliable.

MEDICO-POLITICAL.

A MEETING OF THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, Adelaide Street, Brisbane, on June 18, 1926, DR. E. SANDFORD JACKSON, the President, in the chair.

Report of the Royal Commission on Health.

The meeting had been convened to discuss the report of the Royal Commission on Health.

DR. J. COFFEY said that he had come to the meeting to represent Dr. John I. Moore, the Commissioner of Health, who was unable to be present. Dr. Moore had directed to Dr. Coffey to say that he would be willing to cooperate with other bodies in any way that he could.

DR. A. JEFFERIS TURNER said that he thought the cooperation of the Commonwealth in health matters should be welcomed. Without committing himself to every detail he thought it was an excellent report. In regard to the standards for drugs and foods he thought uniformity would be a good thing, but the Queensland standard which he believed to be the highest in the Commonwealth, should not be lowered.

DR. A. C. F. HALFORD hoped that the outcome of the recommendations would result in concentration on the individual rather than on the environment and that education of the public in the control of the spread of disease should be the aim of all legislation. He moved that the recommendations of the Commission be adopted in general terms.

DR. D. GIFFORD CROLL, C.B.E., drew attention to Section 7—Maternity Hygiene—which showed that whereas in 1913 the percentage of mothers attended by doctors was 63·2% and in 1925 79·3%, there had been no fall in maternity mortality. He considered this condition should not be allowed to continue and thought a committee should be appointed to go into the matter so far as it applied to Queensland.

DR. A. STEWART considered that the hard working man had no time "to be an early case of tuberculosis." He thought that the prevalent custom of sending all and sundry to the west or telling them to go to the west created much trouble. It was far better to attempt to get a man back to his work in his own town. There was to be had in the west plenty of good food, if the patient had the money to buy it and there was plenty of good air for all, but people could not live on air. Sanatorium treatment was excellent, if the man had a definite job to go to or a definite future assured after leaving the sanatorium. The nomad, suffering from tuberculosis, was the difficult person in the tuberculosis problem. He thoroughly agreed with the recommendations proposing to subsidize a man who was unfortunate enough to develope tuberculosis. On the whole he considered that the village system, such as Papworth, was the best method of dealing with the tuberculosis problem. He was glad to hear from the President that something was to be done in the matter of research in tuberculosis, as he considered this problem had been too much neglected and research was needed more in this subject than in any other. Dr. Stewart was of the opinion that the overcrowding existing in Brisbane was disgraceful and those in authority should take steps to remedy it.

The questions of milk supply and mosquitoes warranted most careful attention.

DR. S. F. MCDONALD was in favour of the proposals generally. He thought it was most important that the right kind of man should be appointed, if the scheme was to be a success and the remuneration under the Commonwealth services should be of a sufficient scale to attract the right kind of man and there should be security of tenure of office. He thought that the backward state of public health in Queensland was a great argument in favour of the necessity of some such scheme as that under discussion.

He was greatly in favour of the recommendations in regard to tuberculosis. He thought that excellent work was being done in the curing of patients in the early stages at Diamantina Hospital. More provision should be made for early cases. Owing to the fact that Diamantina Hospital was considered to be a hospital for incurables, many patients in the early stages of tuberculosis would not go there for treatment.

He stated that the Federal Government had already done excellent work in establishing laboratories in the country and their medical officers in the country centres were cooperating in an excellent manner with the practitioners.

Another way in which the Federal Government might help would be in establishing positions similar to that occupied by Dr. Allan in Victoria as Director of Obstetric Research and in this way much good work was done, especially in the matter of smoothing over difficulties between practitioners themselves and practitioners and State and municipal authorities.

DR. H. W. TILLING said that they were informed that the object of the Commission was to inquire and report upon public health as a matter for legislation and administration by the Commonwealth. As with most reports from Royal Commissions it was somewhat difficult to sort out those portions really worthy of thought from the mere verbosities. These reports needed studying to an extent that was not possible for the ordinary busy individual, in any case only those points that were of particular interest to him would receive his careful consideration.

In this particular report the intention apparently from the commencement was to endeavour to create some scheme whereby the Commonwealth could take complete control of the health administration of the country.

Quite apart from the consideration of the fact that the essential health services were so bound up with local authority government that it would be an impossibility for the Commonwealth to administer them, the original intention had been broadly negatived by the Commission's own finding, namely:

> Page 20 (paragraph 3).—The tendency of those who have studied the subject most closely is to avoid centralization of authority and to devolve health administration on to local authorities. Success in any field of administration depends on the consenting attitude and goodwill of the people affected—without such goodwill, legal powers are almost valueless.
>
> Page 15 (last paragraph).—From our own experience and investigations whilst visiting all the States, we recognize that in a country so large, so diverse in climatic and other conditions and so sparsely populated as Australia, a Commonwealth Ministry of Health, similar to that of Great Britain could not effectively carry out its functions, except by devolving its powers on local authorities in the several States and we do not recommend that any action be taken by the Commonwealth to obtain general powers to legislate on health, unless approved by the State, as provided by the constitution.

This apparently negatived the recommendation Part III. (1) *re* amending the *Quarantine Act*.

Whilst fully recognizing that standardized statistical investigations and records were not only desirable but essential, Dr. Tilling did not think that the Commonwealth should undertake the control of this department or for a matter of fact any State Government, for the reason that the individuality of the person in charge and necessarily any good that might be evolved from such records, would in all probability be buried under the onerous clerical and routine procedures that appeared to be necessary for a Government department. With medical records, in his opinion it was essential for the statistician to have an absolutely free hand and not to be hampered by routine.

He considered that there should be a medical record department in each State and a central one at the seat of Government, but that these should be administered by an independent board and subsidized by the Commonwealth.

In dealing with matters that did not appreciably vary in the various States, for example venereal disease, tuberculosis, maternity hygiene, child welfare, he considered that it would be advisable for the Commonwealth to formulate some uniform plan and subsidize the States in order that that plan could be carried out in principle.

Quarantine was essentially a Commonwealth matter, but the Commonwealth should keep in touch with and keep the States and also the municipal authorities informed of any plans or procedures that they might have evolved to deal with the checking of epidemics.

In regard to Part XI. Section 1 he thought that statistics should be furnished to State statistical departments and not to the Commonwealth.

Dr. Tilling also said that he would like to mention that the number of sittings of the Commission given to Queensland was hardly in keeping with the importance of the State.

Queensland had been granted six sittings, New South Wales twenty-eight, Victoria thirty-five, South Australia nine, Western Australia five and Tasmania five.

Of the witnesses in Brisbane half were Government officials, whilst one-third of the total witnesses were in Government employ. This made the whole almost an inter-departmental inquiry.

DR. F. DE MONCHAUX discussed the question of venereal disease. He said that gonorrhœa was next to measles the most widespread and ubiquitous of all diseases and that syphilis alone was probably responsible for more deaths than other diseases with the possible exceptions of malignant disease and tuberculosis. He referred to the apathy and indifference displayed not only by the general public but also by members of the medical profession towards the subject of venereal disease. They should realize their obligations and responsibilities in the matter.

One bad result of medical indifference was that the so-called control of venereal disease, especially as far as Australia was concerned, had become more political than medical. The findings of the Royal Commission confirmed this. In Australia the control of venereal disease consisted in the formulation of several different systems of legislation together with a rather feeble attempt, varying considerably in the different States, to put the provisions of the legislation into effect. The result in several States, for example New South Wales, would be comic, if it were not so tragic. He had had some experience of the *Venereal Diseases Act* in New South Wales and he said quite unhesitatingly that this Act was nothing more nor less than a white elephant and from any practical point of view was not worth either the time spent on its formulation or the paper and print wasted in its publication. In Queensland and in Western Australia things were somewhat better. In both these States, however, they were only on the fringe of anything effective or worth while. He was familiar with the Queensland system and held that it would be a long time before they could claim to have done anything at all to stem the venereal tide.

There was far too much political control. Not nearly enough scope or freedom was given to the medical officers who were supposed to be in charge of the departments dealing with this matter. Nothing would be achieved until it was realized that special work in any domain should be done by specialists. When the powers that be in a spasm of transient wisdom appointed special people to special jobs, they began to neutralize all the possible good by hampering and generally interfering with those people in every possible way. In Brisbane the Health Department was the Cinderella of all departments; there was not even a health ministry. The department was controlled by men whose training (even though they might be politicians which often meant magsmen) fitted them to be head gardeners or greengrocers. He said this without wishing to disparage gardeners or greengrocers, they were certainly not fitted to have control of health and health matters. Dr. de Monchaux described the appalling and "pre-Listerian" condition of the Venereal Disease Clinic at the Health Department. He had invited members of the Royal Commission to inspect the clinic and they had been appalled by the conditions under which a qualified medical practitioner was compelled to work.

The effect of the legislation with all its inadequacies and imperfections would be limited to the control of the disease when it was established. It could not influence the more important question of prevention. The only thing that would have any effect on the incidence of the disease, was a properly organized campaign of instruction and information. An ounce of education was worth a ton of legislation.

The Royal Commission seemed to favour the control of venereal disease being taken over by the Federal authorities. With this he was in entire accord. They had an ineffective system of State control (in some States no control) aided by Commonwealth grants. The varying control and its lack of uniformity did not provoke efficiency and should be abandoned in favour of a central and uniform scheme under Federal control and subsidy.

Such a scheme should be carried out by a team of experts in different centres all over Australia. Venereal disease could easily be controlled and managed on account of its nature and uniformity. It was the same all the world over; a hard chancre in Greenland was exactly the same as a hard chancre in New Zealand. This meant that the control of venereal disease could be made much more general and uniform. He was strongly in favour of the recommendations of the Royal Commission and would urge their adoption and execution.

The control of venereal disease was for the most part bound up with the control of women suffering from the disease and especially with the control of what he called the non-professional prostitute and the enthusiastic amateur. The woman who openly professed prostitution, was not such a cause of trouble, because she looked after herself and to some extent prevented the spread of infection. The amateur did more to spread venereal disease than any one else and all attempts to control must be directed towards her, if any good was to be accomplished. They had in Brisbane a detention hospital to which professional prostitutes were committed when found to be suffering from venereal disease and where they were detained until they were apparently cured. Dr. de Monchaux held that while this hospital did a certain amount of good, it hardly justified its *raison d'être*. These women were but a drop of water in the ocean of the venereally infected. In an ideal State all patients suffering from contagious diseases, including gonorrhœa and syphilis, would be isolated and cut off from all communication with their fellow men. This would imply regular and thorough examination of every member of the community. If such a system were enforced, there would doubtless be partial if not complete industrial disruption and economic paralysis, but it would be possible after a few years to regard venereal disease as more or less a thing of the unhygienic past. This might appear Utopian and idealistic, but he did not believe for a moment that with increasing enlightenment and education such a state of affairs was by any means impossible or impracticable. His views were no more idealistic nor Utopian than those of the Royal Commission when they suggested that two persons, proposing to marry, should be medically examined for the presence or absence of venereal disease.

DR. J. V. DUHIG said that he was unable to deal with most of the report in a properly expert way and would confine his remarks to those parts dealing with matters with which he was more or less familiar.

This should not be taken to mean that he agreed by default with such parts as he did not discuss, since defects therein might be satisfactorily demonstrated by experts in the particular details.

In regard to page 18, part 3, paragraph 8, the suggested chair of tropical hygiene would best be established in Brisbane. This was another and cogent reason for the establishment of a medical school in the University of Queensland.

Paragraph 9 was extremely vague. He could not see why field health and laboratory officers could not be trained in any approved laboratory such, for example, as the laboratory that would be used in connexion with the suggested chair of tropical hygiene at Sydney.

The ordinary qualified laboratory worker played just as important a part in the health of the community as the specialized "public health" man. He regarded preventive medicine as dealing with all disease, even gout and nephritis and he thought every laboratory worker in Australia should be enrolled in the preventive campaign. He would extend the teaching scope of the Serum Laboratories and make them a post-graduate school of pathology, bacteriology and biochemistry. He would elaborate this view under the heading of research.

Part 4 B, paragraph 11 (*c*), (*d*) and (*e*) raised the whole question of control of the scientific side of preventive medicine. Apparently owing to very reprehensible apathy and neglect on the part of State health authorities the Commonwealth was forced to invade fields properly the sphere of the States. The results were no doubt admirable, but a final decision must soon be taken as to what authority was to be in sole control. In Queensland the Commissioner of Public Health ran a laboratory only moderately well. The Brisbane and South Coast Hospitals Board had founded a complete laboratory for clinical research and for public health investigations in connexion with the work of the Brisbane City Health Department. This laboratory would serve the south-eastern corner of Queensland and at the same time do work for doctors and hospitals all over Queensland, the work being voluntarily submitted. Then in three provincial towns the Commonwealth had laboratories of the best type as to buildings, equipment and personnel, controlled curiously enough not by the Director of Laboratories, but by the Chief Quarantine Officer for the Division.

The position was altogether anomalous. In his opinion public hygiene was essentially and inevitably a local concern and should be administered locally. He could not consent to control of health work from Melbourne, in regard to the medical officer of health. The unsatisfactory handling of the Townsville Institute since Dr. Breinl's resignation was not a good recommendation for centralized control from a great distance. He would submit later a scheme for joint central and local control of laboratories.

His remedy for the anomaly would be discussed under the head of "Research" (Part 10).

In regard to Part 5, paragraph 2, page 27, the defect noted by the Commission in the Laboratory of the Public Health Department in Brisbane could be remedied, if a venereal diseases clinic were established, as it should be at the general hospital. All laboratory examinations could then be satisfactorily done.

In regard to the whole of Part 6 he concurred.

Part 10, page 45, raised the whole question of provision for and development of the laboratory side of medicine and its control.

There was no coordination of research effort in Australia and still less any expert direction, guidance or control. While working in England he had been forcibly struck by the excellent work of the (then) Medical Research Committee. He wanted to see a similar scheme in Australia. When he drafted the report of the Queensland Branch of the British Medical Association for the Insurance Commission he had made the first demand that had been made in Australia for a medical research council and followed the demand up with a letter on similar lines to THE MEDICAL JOURNAL OF AUSTRALIA.

He had discussed the matter personally and by letter with Dr. Penfold, who took it up with Professor Berry and later with Professor MacCallum.

A meeting of pathologists had been held in Melbourne about the end of March, 1925, to discuss the formation of a medical research council in Australia and to devise means and plans and draw up estimates. He had been present at that meeting. Before leaving Melbourne he had again discussed the matter with Dr. Penfold and had impressed him with the necessity of such a body for the purposes of such States as had no medical schools.

The outcome of it all was the joint memorandum of Professor Berry and Professor MacCallum devised by men peculiarly competent for the work. The Commission wanted to alter the plan in an extremely vital way. With the suggestions of the Commission in paragraphs 5 and 6 he flatly and fundamentally disagreed. He would have nothing more nor less than the constitution proposed in the joint memorandum for the following reasons:

At the outset he would have the controlling body, whatever its nature, absolutely outside the control of any existing department of State; in other words, it would be in itself a department responsible directly to a minister, the Treasurer for preference. For this purpose there would be needed two bodies: (i.) a large representative council to discuss and plan general organization and finance, acting on the advice of (ii.) the scientific committee later to be discussed. The president and secretary should have direct access to the minister.

The scientific committee should consist of men with long and distinguished research records and should have complete intellectual and scientific freedom. Their work should be limited only by the amount of money available from

the parliamentary grant. The constitution of the research body suggested by the Commission would not give anything like the result obtained under the British system.

The Commission suggested that the Director-General of Health should be a member of the controlling body *ex officio*. It was difficult to see why. He was welcome to a place, but only on his merits. By the very nature of his job he was less likely to be familiar with research problems and methods than research workers themselves.

The research council should take complete control over every public medical laboratory in Australia and its secretary should constantly visit the laboratories to see that the lines of research laid down by the council were being properly followed.

The scientific committee should meet quarterly to discuss and recommend lines of work and it should be the duty of the council to see that they were followed. The council would naturally be representative of all parts of the country and of all interested bodies.

The various laboratories throughout the country should be at the disposal of local bodies controlling health, namely the health council representing the local government bodies as suggested by the Commission and the representatives of those bodies to which laboratories were assigned, should have free access to them at all reasonable times and those bodies should have as a right prompt and efficient service from the laboratories. The laboratory personnel should be subject to the local authority for discipline.

The local health authority should have a right to suggest to the Council what lines of research should be followed to meet particular local conditions or to solve local problems and should pay to the Council whatever charges were incurred in doing their work.

In this way there would be secured: (i.) Proper coordination of laboratory work throughout Australia. (ii.) Expert control, direction and help on the purely scientific side. (iii.) The very desirable local control of liaison between laboratory and local authority.

The research council should also try to make provision for post-graduate medical teaching of all kinds which should include some sort of grants-in-aid to practitioners who could not afford the financial loss of practice during the time spent away from home.

With paragraphs 7, 8, and 9 he concurred.

DR. P. J. KERWIN concurred with the recommendations of the Commission as a whole especially as regards the State. What was wanted in Queensland was a ministry of health and as recommended in the report a health council. In his opinion it was a farce to have the health of country towns and districts under the control of men who had had no training or knowledge of public health as they had at present in the various shire councils.

The following resolution was put to the meeting and carried unanimously:

That the broad principles of the report be adopted.

Uniform Registration.

THE following matter was brought up in regard to the question of federal uniform registration, as it was thought it might be a good opportunity to have something done in the matter of quackery and that some such regulations as the following might be brought in by the Federal Health authorities:

> No person, whether registered medical practitioner or other, shall indicate by any name-plate, advertisement in the press, handbill or circular letter or by any other form of advertisement that he or she is possessed of any particular skill in relation to the treatment of any disease or group of diseases, unless he or she shall produce to the satisfaction of the Registration Board (Commonwealth or State) a diploma or certificate issued by a Statutory Body, showing that he or she has undergone a special course of study in relation to and is proficient in the treatment of the disease or group of diseases in respect to which he or she claims special skill.
> (Schedule of Statutory Bodies to follow here.)

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Smith, William C., M.B., Ch.M., 1925 (Univ. Sydney), Coast Hospital, Little Bay.
Findlay, Andrew Parkes, M.B., Ch.M., 1926 (Univ. Sydney), 38, Lang Road, Centennial Park.
Dixon, Phillip Vernon, M.B., Ch.M., 1924 (Univ. Sydney), George's River Road, Croydon Park.

Correspondence.

PALPATION.

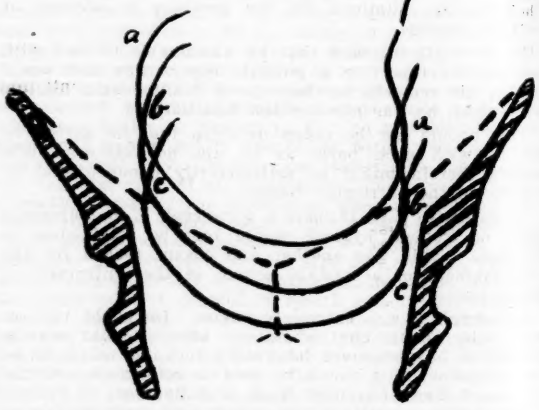
SIR: I have read with great interest Professor Windeyer's article in the current number of the Journal.

I feel with him that abdominal palpation, apart from its convenience and time saving, provides us with such valuable information that points in connexion with it cannot be too strongly stressed.

1. A simple, if rather crude catechism will crystallize a lot of the information derived from Professor Windeyer's third, fourth and fifth "steps." In every case, when employing the so-called "pelvic grips" I ask:

(i.) Is it a head?
(ii.) What position and attitude?
(iii.) Is it fixed?
(iv.) Will it come through?
(v.) What is the progress?

2. An easy way of following the advance of the head is to palpate the two "ends" of the head more or less



as in Professor Windeyer's fourth step. At first we feel both ends; later we can just feel the face; later both ends disappear by which time the shoulder is nearing the symphysis. Very soon (and this although not "abdominal" is a very useful "palpation" method) the head can be picked up by pressing up in front of the tip of the coccyx.

3. Where there is difficulty in fitting the head into the brim (*vide* Professor Windeyer's fifth step) the patient by half sitting upon the table will succeed very easily in jamming the head down.

Yours, etc.,

JOHN S. GREEN, M.D. (Melbourne), D.G.O. (Dublin).
Women's Hospital, Melbourne.
July 31, 1926.

QUACKERY.

SIR: I read with much pleasure a paper which appeared in THE MEDICAL JOURNAL OF AUSTRALIA recently, entitled "Some Heterodox Opinions."

It is a pity that we do not get more papers of a similar type. I was sorry, however, that the author did not turn the hose of his criticism upon that accumulation of rubbish known as "glandular therapy."

Nobody doubts the fact that ductless glands and other organs secrete substances of vast importance to the economy of the organism, but surely nobody conversant with the facts can doubt that with very few exceptions such substances are totally destroyed if introduced into the stomach.

If one excepts the secretions of the thyreoid and parathyreoid glands, there is not a vestige of evidence that any of these bodies produces any effect whatever if swallowed; on the contrary there is convincing evidence that with the two exceptions noted they are all totally destroyed.

Adrenalin, pituitrin and "Insulin" all possess powerful and easily recognized physiological effects, yet experiment has conclusively proved that not one of these effects can be produced, even in the slightest degree, when any of these is introduced into the stomach.

The market is just at present inundated with tablets of ovary, testes, prostate, mamma, placenta and so on *ad nauseam* and I presume that manufacturers would not continue to make such, unless misguided people were credulous enough to use them.

Not satisfied with these simple substances, they are producing still more tablets containing fearsome combinations and ceaselessly bombarding us with "literature" instructing us as to how, when, where and why we should use them, thus piling a Pelion of humbug upon an Ossa of credulity.

I expect to see shortly upon the market a tablet of bursa for the treatment of housemaid's knee and one of *pia mater* for use in meningitis or perhaps for this latter we may have one of "Combined Cerebral Membranes." Such treatment would be quite as rational as the great bulk of "glandular therapy."

I have no doubt but that wonderful cures are achieved by means of tablets made from various organs, nor do I doubt that equally miraculous cures would result from tablets made of mud, provided that the bottles containing them were labelled: "Tablets of Adreno-Spermio-Thymo-Cerebro-Prostate."

Such benefit as may result is due to suggestion acting upon the patient and auto-suggestion acting upon the doctor.

I am fully aware that this letter will make no impression upon the auto-suggested or the cheerful idiot who counters a statement of ascertained fact with the rejoinder: "Well, I had a case that" *et cetera*, for such people, like the christian scientist, the osteopath or the Abrahamist, are incapable of being reached through the medium of intelligence.

Unfortunately mankind is very largely composed of such.

Yours, etc.,

ARTHUR S. VALLACK.

North Sydney.
July 30, 1926.

COMPENSATION AND INJURY TO THE BACK.

SIR: In view of the new *Compensation Act* and my own ignorance may I ask one of your readers to advise me as to a common so-called accident, namely strain or tearing of the lumbar fascia and tendons? I have recently had a wide experience of claims for compensation made by men who give a history such as: I was feeding a crusher—spawling—carrying a bag of cement and I hurt my back. It was like a knife—a red-hot wire *et cetera*. Such cases present no objective symptoms. Local tenderness on digital pressure is usually found, varying in position momentarily and usually grossly exaggerated. Unfitness to work results for varying periods. In a construction works employing some eight hundred and fifty hands I found 15% of claims based on such histories. To aid diagnosis I have asked if the patient was doing his usual work, how long had he been accustomed to it and if anything else happened at the time—did he slip or fall, did anything give way (a rope?) or break? I ask these, as I cannot believe that a man by doing accustomed work can acutely and suddenly injure the lumbar tendons or fascia. Though I dare not offer a definition of "lumbago" I believe such cases to be that and nothing more. For the moment I have no library at hand from which I can quote instances of sudden seizures of the kind whilst picking up a golf ball, shaving, tying a bootlace, boxing; most of us have treated them, some of us have suffered personally. One noticeable fact is that the worker attacked at 10 a.m. on a working day reports an accident, but, if attacked at the same time whilst in his garden on Sunday, is content with a diagnosis of lumbago. Though scores of cases have come to me from colleagues with a written diagnosis of strained or torn fascia *et cetera* I have not yet met one who can tell me what structure is affected or explain his diagnosis by other evidence than the patients' statements. I am not forgetting strains *et cetera* consequent upon sudden unexpected violent exertion of the affected part, resulting in interruption of internervo-muscular coordinations, but I repeat that I cannot conceive of fascia muscles or tendons being suddenly and acutely affected by accustomed use. A typical case seen yesterday has determined this letter. A labourer, aged about forty years, "strained" his back whilst emptying a tip dray—his usual job—was admitted three weeks ago and told he "had torn the tendons partly through." Discharged three days ago he intended to resume work three days later—the down-trodden workers' two sabbaths intervening. He went yesterday morning to the latrine at 10 a.m., had a normal evacuation, found he could not get off the seat, was carried to his bed and sent for me. I saw him for the first time at 10.30 a.m.; he was apparently in acute pain of a spasmodic nature. There were no objective signs whatever. I returned him to hospital. He told me the second seizure was far more sudden and painful than the first. He had not had medicinal treatment in hospital. Can anyone enlighten my ignorance? Were either of these seizures traumatic? If so, which? What happened? If traumatic in origin, how can I tell such from an ordinary myalgia or neuralgia? (oh, that "blessed word" neuritis!). Regarding the employers' liability for such cases—if not due to sudden trauma—how can one argue that because it occurred at work it occurred because of the work? Is it even probable? The first twinge of pain in a tooth does not mark the onset of caries, but follows its commencement at an indefinite and varying time; it may also be primarily produced by a cold draught, by acid or sweet food. Surely these are not the cause of the caries? Is it not reasonable to believe that the occurrence of pain in both cases argues an incidence of disease at an earlier period and that the cold draught, the lolly, the apple or the lifting of a golf ball or bag of cement merely determines the time at which pain occurs? Incidentally I have found that careful examination of 50% of "strained backs" discovers stiffness of muscles or joints elsewhere and 25% give a history of definite previous rheumatism.

Yours, etc.,

GERALD S. SAMUELSON, M.D.

Lane Cove Road, Sydney,
July 20, 1926.

A CHAIR OF PREVENTIVE MEDICINE.

SIR: Informal discussion is proceeding at present respecting the establishment of chairs of preventive medicine in Australian universities.

I venture to write and ask medical practitioners to give the matter a little thought before they are committed. What is a chair of preventive medicine? How can medi-

cine properly be regarded apart from prevention? Should not prevention be part of the life work of all of us?

In the army I roughly estimated that one-third of the time of the medical officer was devoted to prevention, one-third to treatment and one-third to the task of finding suitable occupation for those partially disabled. In civil life, however, sufficient emphasis has not been laid on the first and last of these activities.

Preventive medicine is not a subject. It cannot be railed off from medicine in general and as Dr. C. J. Martin expressed himself: "It is an attitude, not a subject." It should enter into the life of every practitioner no matter what special calling he follows. What is really requisite is to give the medical schools a bias in the direction of prevention and I am very doubtful whether this necessary result can best be attained by endeavouring to separate preventive medicine as a subject. As a distinguished administrator in Great Britain (Sir George Newman) put it to me, the ideal attitude on the part of every practitioner when consulted by a patient should be expressed in the following terms:

"In the mind of the practitioner would arise the thought: 'How came the patient in this plight? What can I do to help him out of it? And, if the cure is not complete, what must be done to find some niche in the social edifice in which he can still be useful?'"

I am of opinion that the money that would be requisite to establish chairs of preventive medicine could be more profitably employed in other directions in the various medical schools.

Yours, etc.,

JAMES W. BARRETT.

105, Collins Street, Melbourne.
August 4, 1926.

Books Received.

THE ART AND PRACTICE OF MEDICAL WRITING, by George H. Simmonds, M.D., and Morris Fishbein, M.D.; 1925. Chicago: American Medical Association. Crown 8vo., pp. 163, with illustrations. Price: 7s. 6d. net.

EDGAR'S PRACTICE OF OBSTETRICS, by J. Clifton Edgar, revised by Norris W. Vaux; 1926. Philadelphia: P. Blakiston's Son and Company. Crown 4to., pp. 795, with 684 illustrations, including five coloured plates and 38 figures printed in colours.

Medical Appointments.

Dr. Noel Pryde (B.M.A.) has been appointed Public Vaccinator at Balmoral, Victoria.

* * * *

Dr. Ernest Robertson (B.M.A.) has been appointed Public Vaccinator at North Carlton and at Carlton Refuge, Victoria.

* * * *

Dr. Thomas Ross Jagger (B.M.A.) has been appointed Public Vaccinator at Rainbow, Victoria.

* * * *

Dr. Charles Richard Maitland Pattison has been appointed Acting Medical Officer, Aboriginal Settlement, Palm Island, Queensland.

* * * *

Dr. John McCall (B.M.A.), has been appointed Medical Officer of Health to the Bassendean Road Board, Western Australia.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xx.

ROYAL HOSPITAL FOR WOMEN, PADDINGTON: Junior Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital. Cook District Hospital.
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Diary for the Month.

AUG. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUG. 24.—Illawarra Suburbs Medical Association, New South Wales.
AUG. 25.—Victorian Branch, B.M.A.: Council.
AUG. 26.—New South Wales Branch, B.M.A.: Branch.
AUG. 26.—South Australian Branch, B.M.A.: Branch.
AUG. 27.—Queensland Branch, B.M.A.: Council.
SEPT. 1.—Victorian Branch, B.M.A.: Branch.
SEPT. 1.—Western Australian Branch, B.M.A.: Council.
SEPT. 2.—South Australian Branch, B.M.A.: Council.
SEPT. 3.—Queensland Branch, B.M.A.: Branch.
SEPT. 7.—Tasmanian Branch, B.M.A.: Council.
SEPT. 8.—New South Wales Branch, B.M.A.: Nomination of Candidates for Federal Committee.
SEPT. 9.—Victorian Branch, B.M.A.: Council.
SEPT. 9.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 10.—Queensland Branch, B.M.A.: Council.
SEPT. 10.—Central Southern Medical Association, New South Wales.
SEPT. 14.—Tasmanian Branch, B.M.A.: Branch.

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